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COMMON AND PREFERRED STOCKS AS INVESTMENTS

II

IV. FINDINGS FOR MULTIPLE-YEAR INVESTMENT PERIODS

THE discussion of results has been confined so far to the original hypothesis that each year the amount invested should be exactly the same; if the previous year's operations have shown a loss, an additional sum should be put in so as to bring up the investment to the original amount; if a gain was made the year before, the amount above the original investment should be withdrawn. It was also assumed that this total should be divided equally among all common stocks and preferred stocks of companies having both classes quoted at the beginning of the period. This method—which might be thought of as taking one hundred dollars and investing it the first year; at the end of the first year withdrawing it with profit or loss as the case may have been; then for the second year taking another hundred dollars, investing it, and in the same manner closing the account at the end of the second year; and so on for the given term of years, differs considerably from the usual practice of investing a fixed amount and leaving it throughout the period.

Suppose the two methods are compared by means of a hypothetical case, using, for convenience, a single share of stock. Assume a purchase of one share at one hundred dollars. Assume further that at the end of the first year this stock is selling at

fifty dollars, but that by the end of the second year it has regained its former price of one hundred dollars. An investment in this stock, held continuously throughout the period, would show neither loss nor gain. If, however, the plan of this paper, involving a sale at the end of the first year and a purchase of one hundred dollars' worth of the stock at the beginning of the second year, were followed, the stock would be sold and a loss of fifty dollars recorded at the end of the first year; but the second year two shares could be bought for one hundred dollars, and, if the stock rose to one hundred dollars per share, the profit at the end of that year would be one hundred dollars. After subtracting the fifty dollars loss of the first year, there would be fifty dollars net gain when following this plan of investment. The assumption should be noted, however, that after the first loss of fifty dollars another fifty dollars was available to bring the investment back to its original size.

In a second hypothetical case let the stock be selling at fifty dollars at the beginning of the first year, one hundred dollars at the beginning of the second year, and fifty dollars again at the end of the second year. By holding the shares continuously for the two-year period, there would again be neither loss nor gain. But by following the plan of this study the shares would be sold at the end of the first year for a profit of one hundred dollars; one share would then be purchased at one hundred dollars and this share would be sold at a loss of fifty dollars the second year. The net gain would again be fifty dollars.

If the gross return at the end of each year is expressed as a percentage of the purchase price, and the arithmetic mean of these relatives for a series of years calculated, the result will not represent the average return on an investment of one hundred dollars made at the beginning of the period and left undisturbed for the entire period. But if the relatives of each class are averaged geometrically the result is the average compound rate obtained on the investments in the class, made at the beginning of the period, and (except for equal redivision each year among all the quoted stocks of the class) left to accumulate or depreciate.[1]

[1] In the illustration the relatives were 200 per cent and 50 per cent. The geometric mean of these is 100 per cent.

It is an elementary proposition in statistics that the geometric mean is always less than the arithmetic mean. Therefore the results secured by averaging the relatives geometrically will not correspond to those secured by averaging them arithmetically. For example, if the preferred stock proves to be a better investment for a given period when the relatives are averaged geometrically, it will not necessarily prove better when they are averaged arithmetically. Let the first illustration given describe the returns on a common stock, and then let the preferred stock of this company show a small increase in value each year, say 5 per cent. When the relatives are averaged geometrically the preferred stock shows a higher return, but when averaged arithmetically the common stock is superior.

In order to find which class of stock yields the higher average return, on the assumption that the investment is brought back each year to its original size, the relatives may be averaged arithmetically. But to see which is the better if the total investment is left untouched, it is necessary that a geometric average of the relatives be taken. The relatives given in Tables II, III, and IV[2] may be looked upon as link relatives of the accumulated investment in successive years. By multiplying each relative by that for the following year and dividing by 100, a table of chain relatives can be constructed. Such a table shows the amount to which an investment made in the first year would accumulate by any subsequent year. Moreover, it is possible to compare the accumulation in value for any desired term of years within the period. This may be accomplished by dividing the chain relative for the end year by the relative for the year of origin. For example, suppose it is desired to find whether common railroad stocks would have been a better investment than preferred railroad stocks for the period between 1900 and 1914. Dividing the chain relative for 1914, 805.5, by that for 1900, 320.9, gives 251.0 for common stocks. Doing likewise for preferred stocks gives 163.2. Common stocks were the better.

The changes taking place from year to year may be followed more easily when the chain relatives are plotted on a logarithmic

[2] See the *Journal of Business of the University of Chicago*, July, 1928, pp. 312–14.

scale. Tables and charts for the different classes follow (see Tables VI–VIII and Charts IV, V, VI).

TABLE VI

INDEX OF VALUE TO WHICH INVESTMENT MADE AT BEGINNING OF FIRST YEAR WOULD ACCUMULATE (RAILROAD STOCKS*)

Year	Common Stock Chain Relative	Preferred Stock Chain Relative
1886	100.0	100.0
1887	166.5	139.8
1888	130.7	124.0
1889	134.9	167.4
1890	160.4	196.9
1891	149.0	188.8
1892	175.3	215.8
1893	147.3	197.2
1894	116.1	167.7
1895	122.2	177.7
1896	109.3	185.7
1897	119.7	173.3
1898	170.9	232.0
1899	274.3	360.3
1900	320.9	388.4
1901	669.8	570.2
1902	918.9	670.5
1903	833.5	624.3
1904	629.3	538.7
1905	921.9	695.0
1906	1050.0	745.0
1907	853.7	654.1
1908	712.0	558.6
1909	1240.0	827.3
1910	1156.0	808.3
1911	1132.0	818.8
1912	1168.0	863.0
1913	962.3	744.8
1914	805.5	633.8
1915	828.9	596.4
1916	968.9	629.2
1917	1014.0	618.5
1918	670.6	504.1
1919	861.7	571.6
1920	808.2	528.2
1921	821.2	519.7
1922	1222.0	734.9
1923	1101.0	712.1
1924	1247.0	821.1
1925	2115.0	1106.0

* These indexes are obtained by chaining the relatives in Table II. The relative for 1886 is multiplied by the relative for 1887, this result by the relative for 1888, etc.

An examination of the tables and charts discloses the fact that for all three classes, railroad stocks, industrial stocks, and

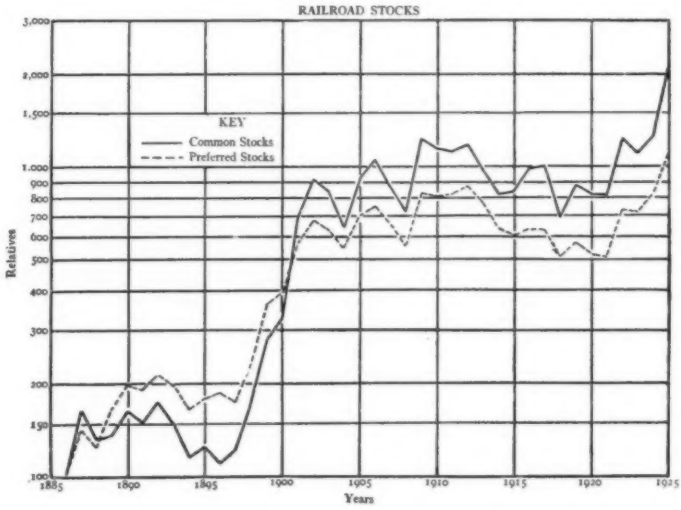
utility stocks, common stocks would have been a better investment than preferred stocks for multiple-year periods far more often than when the contrary would have been true.

There were, however, numerous exceptions. In the railroad section, for example, purchases and sales made before 1900

CHART IV

INDEX OF VALUES TO WHICH INVESTMENT MADE AT BEGINNING OF FIRST YEAR WOULD ACCUMULATE

(THESE INDEXES ARE OBTAINED BY CHAINING THE RELATIVES IN TABLE II. THE RELATIVE FOR 1886 IS MULTIPLIED BY THE RELATIVE FOR 1887; THIS RESULT BY THE RELATIVE FOR 1888, ETC.)



showed results, for the most part, favorable to the preferred stocks. Purchases made in several other years also gave results favorable to preferred stocks in one or two instances. For this group, sales made between 1901 and 1921 quite often showed a loss, regardless of when purchased. In the case of industrial stocks, purchases and sales made between 1895 and 1905 were, for the most part, favorable to the preferred stocks. Purchases in 1906, 1909, 1910, and in the years following 1919 gave a fair proportion of cases favorable to the preferred stocks. As in the

case of railroad stocks, purchases made in several other years also gave results favorable to preferred stocks in one or two

TABLE VII

INDEX OF VALUE TO WHICH INVESTMENT MADE AT BEGINNING OF FIRST YEAR WOULD ACCUMULATE (INDUSTRIAL STOCKS)*

Year	Common Stock Chain Relative	Preferred Stock Chain Relative
1891	100.0	100.0
1892	122.2	123.2
1893	134.9	128.3
1894	114.8	113.5
1895	116.3	123.8
1896	98.1	124.8
1897	80.1	119.3
1898	106.9	139.7
1899	250.7	240.6
1900	189.5	227.9
1901	233.7	249.7
1902	269.4	282.2
1903	251.9	278.0
1904	178.1	253.2
1905	332.3	357.8
1906	436.3	391.1
1907	389.2	373.9
1908	318.4	344.3
1909	491.6	452.1
1910	508.8	460.3
1911	509.3	490.2
1912	595.3	520.6
1913	532.2	507.0
1914	555.1	527.8
1915	618.9	509.9
1916	1092.0	717.4
1917	1237.0	718.1
1918	1158.0	679.3
1919	1743.0	860.0
1920	2046.0	872.1
1921	1755.0	839.8
1922	2129.0	970.0
1923	2216.0	1013.0
1924	1942.0	982.3
1925	2759.0	1238.0

* These indexes are obtained by chaining the relatives in Table III. The relative for 1891 is multiplied by the relative for 1892, this result by the relative for 1893, etc.

cases. For utility stocks, purchases made in 1901, 1902, 1905, 1906, 1907, 1909, 1910, 1911, and 1912 gave results favoring the preferred stocks in a considerable number of cases.

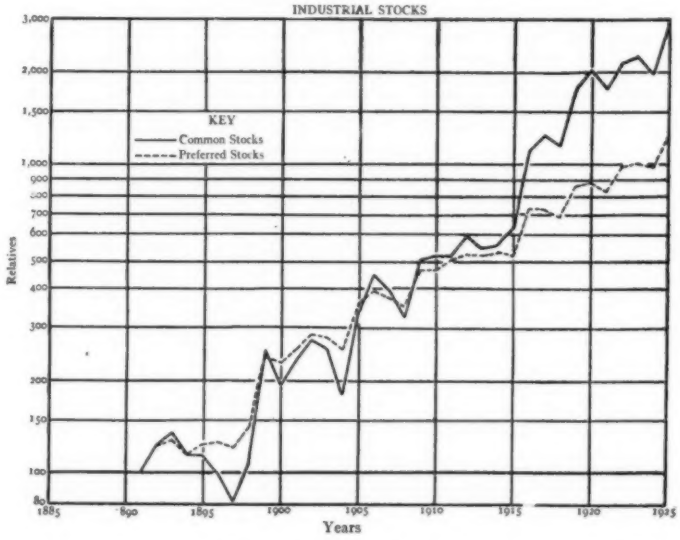
For all classes, the years when the preferred stocks were better were quite frequently years when the market was high, and

in such years neither common nor preferred stocks were good investments, but preferred stocks were not as poor as common stocks. This may suggest that picking the right time to invest is more important than picking the right class of securities in which to invest.

CHART V

INDEX OF VALUE TO WHICH INVESTMENT MADE AT BEGINNING OF FIRST YEAR WOULD ACCUMULATE

(THESE INDEXES ARE OBTAINED BY CHAINING THE RELATIVES IN TABLE II. THE RELATIVE FOR 1886 IS MULTIPLIED BY THE RELATIVE FOR 1887; THIS RESULT BY THE RELATIVE FOR 1888, ETC.)



When discussing the method to be followed in making this study it was said that most of the investigators who have worked in the field have attempted to get a general answer by assuming the purchase of a given list of securities, and the sale of this same list, with perhaps a few substitutions, at the end of the period. Someone may be interested in knowing the result of such a procedure with reference to the list of stocks included in this study. For example: "What would have been the result of a purchase in 1886, with sale in 1925, the same securities to have been held

throughout the period?" While it would be fairly easy to answer a question of this sort from the original data, it is obviously impossible for results to be presented here because of the great number of possible combinations of cases and different periods.[3]

TABLE VIII

INDEX OF VALUE TO WHICH INVESTMENT MADE AT BEGINNING OF FIRST YEAR WOULD ACCUMULATE (PUBLIC UTILITY STOCKS)*

Year	Common Stock Chain Relative	Preferred Stock Chain Relative
1898	100.0	100.0
1899	129.2	122.9
1900	231.5	171.3
1901	283.6	192.1
1902	354.0	216.2
1903	192.2	165.6
1904	154.9	157.7
1905	287.2	201.4
1906	327.7	205.0
1907	288.4	189.0
1908	214.3	163.3
1909	330.4	221.0
1910	341.0	222.5
1911	346.4	223.2
1912	367.6	240.4
1913	315.0	228.1
1914	282.9	221.9
1915	305.2	218.2
1916	319.0	215.1
1917	300.4	198.8
1918	262.6	166.8
1919	242.1	150.4
1920	206.5	120.0
1921	232.5	128.8
1922	314.2	159.5
1923	468.4	184.2
1924	460.5	185.1
1925	700.8	224.9

* These indexes are obtained by chaining the relatives in Table IV. The relative for 1898 is multiplied by the relative for 1899, this result by the relative for 1900, etc.

While the results so far given indicate that common stocks were for the most part a better investment than preferred stocks, they do not show exactly how much better they were, on the average, or in general, and it is the purpose of the study to obtain a generalized result.

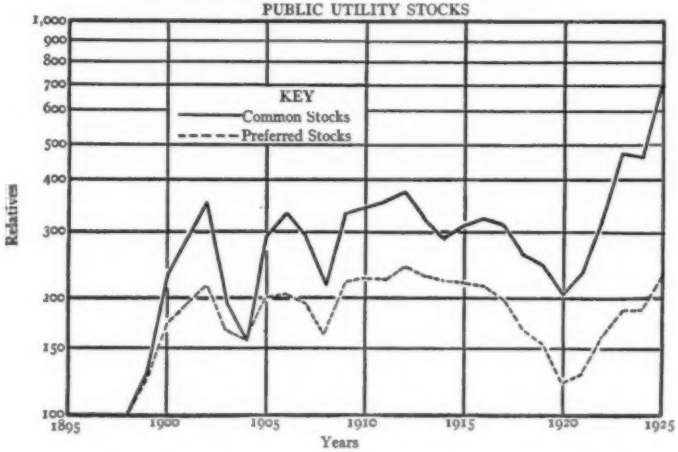
[3] Even if it were possible, we have already shown that such results would have little value in establishing the general proposition.

In order to determine which was the better investment for a *one-year* period, assuming a purchase one year and a sale the next, with each reinvestment the same amount, say one hundred dollars, it will only be necessary, as has been stated before, to add the yearly relatives for common stocks and compare the av-

CHART VI

INDEX OF VALUE TO WHICH INVESTMENT MADE AT BEGINNING OF FIRST YEAR WOULD ACCUMULATE

(THESE INDEXES ARE OBTAINED BY CHAINING THE RELATIVES IN TABLE II. THE RELATIVE FOR 1886 IS MULTIPLIED BY THE RELATIVE FOR 1887; THIS RESULT BY THE RELATIVE FOR 1888, ETC.)



erage with the average for preferred stocks. When this is done for the railroad stocks we get the following results: common stock average, 112 1/10; preferred stock average, 108 1/10. Since the common stock average is the larger, we are justified in saying that the common stocks are the better.

But the foregoing assumes that each year the profit above the original investment of one hundred dollars was withdrawn or enough added to the return to bring up the new investment to one hundred dollars. Suppose this plan had not been followed, but each investment had been left alone (except for being redivided among all companies listed, each year) for *two* years and

then closed out. This corresponds to a first investment made in 1886 and closed out in 1888, a second made in 1888 and closed out in 1890, and so on.

The difference in the two methods may be seen by referring to the summary table for railroad stocks, Table II.[4] One hundred dollars was invested in common stocks in 1886, and in 1887 sold out for $166.50. The next year one hundred dollars was invested and the investment closed out for $78.50. The two transactions taken together show a profit of $45.00. This is equivalent to about 22½ per cent a year. If, however, the investment had been made in 1886 and left undisturbed (except for redivision among companies) until 1888, this would have given the same result as an investment of one hundred dollars the first year; and then when this investment was closed out at the end of the year, the reinvestment of the entire principal and profit, $166.50. Since the next year shows a decrease to 78 5/10 per cent of the investment, the loss is of course much greater than it would have been if only one hundred dollars had been invested. The final result obtained by this method, 114 3/10 per cent (the geometric mean of the relatives for the two years), indicates that there has been earned on an average each year, for the two-year period, only 14 3/10 per cent instead of approximately 22½ per cent.

From the tables of chain relatives the data necessary for computing an average for two-year, three-year, or any desired number of year periods can be obtained. It is easy to forecast that the result of such an experiment for any length period would favor common stocks, since for one-year periods they were not only better than preferred stocks more often than when the contrary was true, but their advantage was also more marked in the years of their superiority than was that of the preferred stocks in their years of success. An examination of the charts showing the accumulated value of the investments is convincing upon this point.

It must not be overlooked, however, that these results were obtained from a particular 39-year period, a period which in-

[4] See the *Journal of Business of the University of Chicago*, July, 1928, p. 312.

cluded a greater number of years when prices were rising than years when they were falling. If the averages had been made by using only the years before 1900, the results would probably have favored preferred stocks. On the other hand, if only the years since 1900 had been considered, results would have been even more favorable to the common stocks.

TABLE IX

RATIO OF AVERAGE COMMON STOCK RELATIVE* TO AVERAGE PREFERRED STOCK RELATIVE†

Year	Railroad Stocks	Industrial Stocks	Utility Stocks	Year	Railroad Stocks	Industrial Stocks	Utility Stocks
1887	119	.....	.....	1907	92	93	95
1888	86	.....	.....	1908	97	89	85
1889	76	.....	.....	1909	117	117	113
1890	101	.....	.....	1910	95	101	102
1891	96	.....	.....	1911	97	93	101
1892	103	.....	.....	1912	98	110	98
1893	92	.....	.....	1913	95	92	90
1894	92	.....	.....	1914	99	100	92
1895	99	.....	.....	1915	109	115	110
1896	85	.....	.....	1916	110	125	105
1897	117	.....	.....	1917	106	113	101
1898	106	.....	.....	1918	81	98	104
1899	103	136	.....	1919	113	118	102
1900	108	80	.....	1920	101	115	107
1901	142	112	.....	1921	103	89	105
1902	116	102	.....	1922	105	105	109
1903	97	94	.....	1923	92	99	129
1904	87	77	84	1924	98	90	97
1905	113	132	145	1925	125	112	125
1906	106	120	112	.....	.....	.....	.....

* These relatives appear in Tables II, III, IV.
† *Ibid.*

V. SOME COLLATERAL RESULTS

1. *A possible forecasting device.*—The relation between common and preferred stocks of railroad, industrial, and public utility companies may be seen more clearly by means of Table IX and Chart VII, in which for each class the common stock-relative is expressed as a percentage of the preferred stock-relative for the same year. If the common and preferred stocks of a given group rose or fell at the same rate and at the same time, all points for that group would be on the "normal" line. If the common stocks of each of the three groups of companies rose or fell at the same time and at the same rate with respect to the preferred

stocks of their respective groups, the three lines would move together. The correspondence or divergence of the lines in their movement shows how nearly they do this. Whenever all three lines are above the 100 per cent, or normal, line it means that the common stocks were better than the preferred stocks for all three classes that year. If all are below the normal line, it means that the preferred stocks were better than the common stocks.

TABLE X*

INSTANCES IN WHICH COMMON STOCKS WERE BETTER IN ONE CLASS BUT PREFERRED STOCKS WERE BETTER IN ANOTHER CLASS

	Railroad Stocks	Industrial Stocks	Public Utility Stocks
1900	Common (49)	Preferred (23)	
†1910	Preferred (37)	Common (55)	Common (18)
†1911	Preferred (37)	Preferred (55)	Common (17)
†1912	Preferred (30)	Common (54)	Preferred (13)
1918	Preferred (29)	Preferred (73)	Common (10)
1921	Common (32)	Preferred (86)	Common (6)
1923	Preferred (34)	Preferred (96)	Common (20)

* The words "common" or "preferred" tell which was the better investment for the year of sale in question. For example, in 1900 (purchase in 1899) railroad common stocks were a better investment than railroad preferred stocks for the one-year period; but industrial preferred stocks were better than industrial common stocks. The numbers in parenthesis refer to the number of cases.

† See Chart VII.

If two are on one side, and one on the other, it means a non-uniformity as set forth in Table X. It will be noted that in most of the cases where contradictions occur, the divergence is not wide, but due merely to the fact that the different classes happened to be close to the normal line.

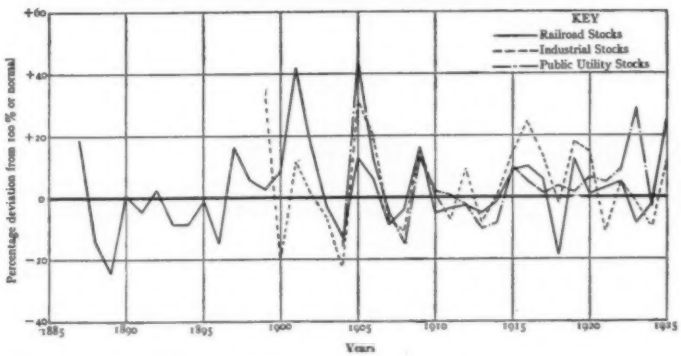
In Chart VII, for the three classes, railroad stocks, industrial stocks, and public utility stocks, all the lines are either above or all below the 100 per cent line every year excepting the years enumerated in the table of exceptions (Table X). This table can best be studied in connection with Chart VII. It will appear from the chart that several of the non-uniformities—

especially those of 1910, 1911, and 1912—are more apparent than real.

An interesting feature of Chart VII is the extent to which business depression seems to be anticipated by the lines dipping below the 100 per cent line. This might appear more plainly if monthly figures were available instead of the ones actually used —those for May 1 of each year. It will appear, however, that the depressions of 1904, 1907, 1914, and the short post-war de-

CHART VII

DEVIATION FROM 100 PER CENT OF THE RATIO OF AVERAGE COMMON STOCK RELATIVE TO AVERAGE PREFERRED STOCK RELATIVE
(THESE RELATIVES APPEAR IN TABLES II, III, AND IV)



pression of 1918 were anticipated by the movement of the lines, whereas the depression of 1921 was preceded by a short downward movement, although the lines turned back before reaching the 100 per cent line.[5]

In order to see just how accurately the line would work as a forecaster, its movement was compared with the movement of a line representing the state of general business activity, prepared by Mr. Rorty and taken from the *Harvard Business Review* for January, 1923. Taking the 100 per cent line on Mr. Rorty's chart as indicating normal conditions and the 100 per cent line on Chart VII as the line from which deviation is significant, the

[5] A method somewhat like this one is used by Persons in forecasting changes in commodity prices.

relation was observed between the time when the ratio line of industrial common stocks to industrial preferred stocks turned downward across the 100 per cent line on Chart VII with the time when Rorty's line of industry turned downward across its 100 per cent line.

Out of seventeen times that the ratio line crossed the 100 per

TABLE XI

RATIO OF AVERAGE COMMON STOCK RELATIVE TO AVERAGE PREFERRED STOCK RELATIVE COMPARED WITH RORTY'S INDEX OF GENERAL BUSINESS ACTIVITY

Time Ratio Line Crossed 100% Line	Time Rorty's Line Crossed 100% Line	Time Interval by Which Ratio Line Preceded Rorty's Line
Down late 1899.....	Down late 1900	1 year
Up late 1900.....	Up early 1901	6 months
.....	Touched but did not cross late 1901	.....
Down early 1902....	Down late 1903	1½ years
Up early 1904.....	Up middle 1905	1¼ years
Down late 1906.....	Down late 1907	1 year
Up middle 1908.....	Up middle 1909	1 year
Down early 1910....	Down early 1911	1 year
Up middle 1911.....	Up early 1912	9 months
Down late 1912.....	Down late 1913	1 year
Up early 1914.....	Up late 1915	1½ years
Down early 1918....	Down early 1919	1 year
Up early 1918.....	Up middle 1919	1½ years
Down late 1920.....	Down late 1920	None
Up late 1921.....	Up late 1922	1 year
Down late 1922.....	Down late 1923	1 year
.....	Up late 1923; down early 1924	.....
Up middle 1924.....	Up late 1924	3 months

cent line, it was followed in every case by the index of general business activity. In only one case, 1920, did it fail to anticipate the line of business activity by at least three months, and in the great majority of cases the time interval was a year or longer. In no case did the ratio line cross the 100 per cent line without being followed by the line of business activity. In one case, 1901, the line of business activity touched the 100 per cent line when this movement had not been anticipated by the ratio line; and in one case, 1923–24, the line of business activity crossed the 100 per cent line both ways without being forecasted by the ratio line. The line of business activity was plotted on a monthly

basis, but the figures from which the ratio line was plotted are yearly quotations for May 1, modified by receipts during the previous year. Everything considered, these results seem quite remarkable, but are only of incidental interest so far as the main purpose of our study is concerned. The stock market has always been highly regarded as a forecaster of business conditions; but prices, or volume of sales, have been the usual subjects of observation. Since these may be affected by many causes not directly related to the market's estimate concerning future industrial activity, it may be possible, by taking the ratio of the two classes of securities for the same companies, to eliminate many of the extraneous influences, leaving in the ratio figure a more accurate indication as to what is the true opinion of the market with respect to the probable course of business.

The line for railroad stocks, or the line for utility stocks, might have been used with almost, but not quite, as much success.

2. *Compensation for bearing risk.*—Another side issue of some interest may be considered in passing. Writers of economic theory have sometimes been uncertain as to the extent to which the risk-bearer receives a compensation for the risk which he bears. Alfred Marshall,[6] for example, says that risky enterprises require a return more than sufficient to compensate for the actuarial value of the risk. Professor C. O. Hardy,[7] on the other hand, makes the statement that it is by no means certain that business enterprises as a whole receive a positive level of profit, meaning by this an amount sufficient to compensate for the actuarial value of the risk.

The results of this study would seem to indicate that the holders of the more risky securities do receive a greater return than the holders of the less risky securities, but only a little more; and it is doubtful whether this little compensates each individual investor, who cannot rely upon the law of large numbers

[6] Alfred Marshall, *Principles of Economics.* (London: Macmillan), 8th ed., pp. 400, 554, 613.

[7] C. O. Hardy, *Risk and Risk-Bearing.* (Chicago: University of Chicago Press, 1923), p. 38.

to average his losses for the additional risk that he, as an individual, takes.

3. *The bearing of non-dividend-paying securities.*—Suppose the study had been confined to dividend-paying companies, what would have been the effect upon the results? In order to find a partial answer to this question, in the list of industrials for the years 1921–25 inclusive, there were counted the cases paying dividends each year. In 1921, 73 per cent of all cases paid dividends; in 1922, 55 per cent; in 1923, 45 per cent; in 1924, 50 per cent; and in 1925, 54 per cent. The large percentage in 1921 may be attributed partly to the fact that the period began May 1,

TABLE XII

Year	Percentage of Dividend-Paying Stocks above General Average	Percentage of Non-Dividend-Paying Stocks above General Average
1921	57	33
1922	57	31
1923	80	24
1924	84	28
1925	32	51

1920, before the depression had begun. Excepting 1921, roughly speaking, half the companies paid dividends each year.

After the companies had been divided into two groups, dividend-paying and non-dividend-paying, the groups were studied to see if there was any difference in the behavior of the two classes from year to year. If there were no relation between the dividend-paying quality of a stock and its relative, it would be expected that the proportion of relatives above the average for the dividend-paying group would be about the same as for the non-dividend-paying group. Counting the number of cases above the average and the number below the average for dividend-paying stocks, and then for non-dividend-paying stocks, yielded results as shown in Table XII.

Rearranging these results alongside the average relative instead of chronologically, we have Table XIII.

The percentage of cases above the average for the two

classes is not only different, but the connection between the size of the average relative and the percentage of cases above the average, both for dividend-paying and non-dividend-paying stocks, is remarkable. Whenever the average general relative is high, the percentage of dividend-paying companies which have a relative above the average is small. As the average general relative decreases, the percentage of dividend-paying companies increases up to a certain point. Whenever the average general relative for all companies is high, the percentage of non-dividend-paying companies having a relative above the average is large. As the average general relative decreases, the percentage of

TABLE XIII

Year	Average General Relative	Percentage of Dividend-Paying Stocks above General Average	Percentage of Non-Dividend-Paying Stocks above General Average
1925	142.1	32	51
1922	121.3	57	31
1923	104.1	80	24
1924	87.6	84	28
1921	85.8	57	33

non-dividend-paying companies having a relative above the average decreases up to a certain point.

It will be noted, however, that after a certain point is reached, the trend of the results changes. For the non-dividend-paying companies, when the average general relative falls to 87 6/10, instead of continuing to decrease, the percentage begins to increase, and when the average falls to 85 8/10, the percentage becomes still larger. For the dividend-paying companies, when the average general relative falls to 85 8/10, instead of continuing to increase, the percentage of companies having a relative above the average shows a decrease.

This test suggests that the same laws work between non-dividend-paying and dividend-paying stocks as between common and preferred stocks. In years when the market is high, the more speculative securities rise to a higher point than less speculative ones. In years when the market is lower, the more speculative securities fall to a lower point than the less speculative ones.

When the average general relative falls extremely low, however, the dividend-paying stocks seem to lose their advantage, and do only a little better than non-dividend-paying stocks, while the non-dividend-paying stocks pick up and become a better investment. This, of course, may be due to the fact that at such a time some rather strong companies fall into the non-dividend-paying class and help the average. It is more likely, however, in this experiment, that a large number of very weak companies got into the dividend-paying class in 1920 and then suffered severely in the reaction of late 1920 and early 1921.

In so far as may safely be judged from such an abbreviated test, the failure to distinguish between dividend-paying and non-dividend-paying stocks in the principal experiment has affected the result as might have been expected. Had the comparisons been made between non-dividend-paying common and preferred stocks, the common stocks would have been better in times of high stock prices and worse in times of low stock prices to an even greater extent than the results show. Had the comparisons been made between dividend-paying common and preferred stocks, the common stocks would have been better in times of high stock prices and worse in times of low stock prices, but the differences would have been less extreme.

VI. PRACTICAL VALUE OF THE STUDY

There is the final problem of relating what has been learned to investment knowledge in general. To what extent are the results capable of being applied to the problems of the individual investor? It will be remembered that this study did not set out to secure results in the form of practical rules for the individual investor to follow. There are some statements of a practical bearing which can be made, however, and while most of them are not new in the sense that they contradict the things people have always believed, they can be made somewhat more authoritatively than has been the case heretofore, and can therefore be relied upon with an increased degree of confidence.

In the first place, neither common nor preferred stocks have an overwhelming advantage. Taking the group as a whole, the results show an advantage in favor of the common stocks when

the period is taken as one year. When several years are combined to form a longer period, the common stocks are quite generally the better. This is due to the fact that while the preferred stocks were better nearly as often as the contrary was true, the common stocks were superior to a greater extent in the years wherein they were better than was true of the preferred stocks in the years wherein they were better. It can be said, therefore, that, public utility stocks excepted, the market did well almost as *often* by buying preferred stocks as by buying common stocks when it bought and held for one year; but it usually did better by buying common stocks when the investment was for several years. On the other hand, even for a one-year period the part of the market which invested in common stock earned a larger average return than the part which invested in preferred stock. This is due to the fact that when the common stocks were a better investment than the preferred stocks they were much better, but when the reverse was true the difference was less, although there were almost as many *times* when the preferred stock was better. This was borne out by the average for the one-year periods.

In the second place, for the period previous to approximately 1900, the preferred stock seemed to be consistently better, both for long- and short-run period. (For this period the data were for the most part railroad stock quotations.) Then, beginning with 1900, it seemed that for long-run periods, at least, the common stocks were the better. This fitted quite well into the theory that for periods of falling prices those securities having a prior claim to earnings and assets are a better investment, while for periods of rising prices the opposite is true.

In the third place, stocks, when classified into groups, tend to move together; both when classification is based upon the nature of business (as railroad, industrial, and public utility) and when classification is based upon priority of claim to earnings and assets (as common and preferred). When the first system of classification is employed, there seems to be some tendency for the industrial group to swing most widely, then the railroad, and least of all, the public utility group. When the sec-

ond method of classification is employed, the common group clearly swings through a wider range.

In the fourth place, there is some evidence of a tendency, just before a period of business depression, for the common stock relative to diminish more rapidly than the preferred stock relative. If there is such a tendency, it may be explained upon the basis that the investment market sees signs of danger ahead and turns to the prior lien securities some time before depression actually arrives. It is impossible, on the basis of the work so far done, to say whether this method of forecasting depression would be much better than simply watching an index of stock market prices.

In conclusion it may be said that one class of stockholders did about as well as the other. In general the investor who could afford to diversify earned a larger return by buying common stock, but we must remember that our results, in large measure, are drawn from a period of rising prices. The investor who could not afford to diversify, but who bought common stock, did better, or worse, depending for the most part upon his good fortune or good judgment in picking the right companies, not primarily because he picked common stock in preference to preferred stock.

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THE PRESENT ECONOMIC CONDITION OF THE TRI-STATE ZINC DISTRICT

THE Tri-State mining area, comprising the southwest part of Missouri, northeast Oklahoma, and southeastern Kansas, and widely known for the production of lead and zinc, is passing through a crisis that may change the district from one of the leading lead and zinc mining regions to one of secondary importance. The value of the lead and zinc concentrates that have been produced from this region is equal to nearly seven hundred million dollars.

Zinc has been used as a metal since prehistoric times, its uses having gradually increased until there are more than two hundred and seventy-five commodities that have zinc as an ingredient, the amount varying from a small proportion of the whole to almost 100 per cent. The greater uses of zinc are found in the galvanizing industry and in the rolled strip zinc-products industry. The concentrates from the Tri-State region lend themselves particularly to use by the galvanizing industry.

Most of the commodities that have zinc as an ingredient are of such a nature that they do not lend themselves to greater increase in consumption, and the uses of these zinc-constructed commodities do not respond to the fluctuating business conditions; that is to say, there is probably about as great a consumption of these commodities in periods of decreasing purchasing power as there is when the purchasing power is at greater heights. The increased use of zinc for additional purposes and as an alloying metal has distinct disadvantages, which are found in the cost of producing zinc metal and in the peculiar qualities of this metal. At one time zinc might have been used as an alloying metal; but before it was accepted industrially, other and more efficient alloys had been developed which were cheaper than those of zinc.

The United States produces more than 50 per cent of the world's zinc supply; and of this amount, the Tri-State district produced during the years from 1924 to 1926 inclusive, more than 50 per cent of the tonnage of the United States (see Table I).

In the past, one of the largest consumers of zinc metal was the galvanizing industry, but this demand has lessened because

TABLE I

MINE PRODUCTION OF ZINC IN THE UNITED STATES*
(IN SHORT TONS)

	1924	1925	1926
Arkansas	4	43	87
Arizona	.....	3,666	6,100
California	1,530	5,745	10,217
Colorado	28,364	30,811	32,500
Idaho	7,670	15,619	26,307
Kentucky	492	429	1,838
Tri-State or Joplin — Kansas	105,392	118,788	126,307
Tri-State or Joplin — Oklahoma	269,137	283,371	272,567
Tri-State or Joplin — S.W. Missouri	12,920	14,794	26,018
Montana	65,238	57,658	73,701
Nevada	5,501	7,411	4,800
New Jersey	84,370	89,261	81,300
New Mexico	10,380	9,246	12,100
New York	4,664	5,158	5,000
Tennessee	14,367	16,256	12,000
Utah	9,281	26,306	47,590
Virginia	2,664	2,732	5,200
Washington	455	609	522
Wisconsin, Illinois	16,539	22,954	29,377
Total	637,977	710,847	773,000

* From Roush and Butts, *The Mineral Industry during 1926* (McGraw-Hill), p. 704.

of the decline of the galvanizing industry, as pointed out by the secretary of the Sheet Steel Trade Extension Association, who reported at the meeting of the American Zinc Institute in the spring of 1927 an acute decline in the use of zinc-coated products. This decline is reflected in the consumption of slab zinc and of zinc concentrates, since at one time over 60 per cent of the production of the Tri-State district was used in the manufacture of galvanized zinc products.

In the consumption of zinc products, Great Britain stands second; but both the smelting and the galvanizing industries were forced to curtail production because of a fuel shortage oc-

casioned by the coal strike in 1926. With the British smelters closing down, the concentrate that normally would have gone to them was turned to Continental smelters, where operations have been carried on at full capacity without interruption. The supply of slab zinc which was being produced on the Continent and in this country added to the ever growing world's surplus stock. The consumption of zinc, limited at best, was further depressed by the virtual closing of the British galvanizing industry. These circumstances combined to weaken seriously the European market for American slab zinc and zinc concentrate. The reflection is perhaps seen best in the decline of the price of concentrate.

The *Commerce Year Book,* published by the United States Department of Commerce, for 1926, indicates that the British and Continental smelters are carrying on extensive research in attempts to develop improved metallurgical processes. Metallurgical engineers in the United States have also been attempting to improve the existing processes or to devise new ones, but so far none of these efforts has met with very much success.

There are specific factors which are exerting even greater influence upon the other zinc-producing regions of the United States. For a great many years the existence of complex ores in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Washington has been known, these ores containing copper, lead, and zinc; iron, lead, and zinc; or silver, lead, and zinc. These ores do not lend themselves to the concentrating or milling processes used in handling simple ores, and were refractory to the old processes of smelting. It was not until the flotation process (more commonly called "differential flotation") became known that operators were enabled to separate these complex ores with results that are beneficial to the miners and to smelters using the electrolytic process of reduction. The increased production in the western states is shown by the increase in tonnage in 1926 over 1925 (1927 figures not available), as shown in Table I. Utah had the greatest individual increase of any state, leading the way with 68 per cent; while the Tri-State region showed an increase of only 4 per cent.[1]

[1] Roush and Butts (ed.), *The Mineral Industry during 1926* (McGraw-Hill), p. 703.

These western ores are very complex in relation to the Tri-State ores, which are exceedingly simple, containing only lead and zinc in the form of sulphides and being very easy of concentration and reduction. In the production of these complex ores, however, one finds enough copper or silver to pay the cost of mining and milling. The lead and zinc ores that are obtained may then be sold at a price which is below the cost of producing ores in the Tri-State district, since this lead and zinc ore is a by-product with no production cost.

With the decrease in the demand for the products of the galvanizing industry, it is not impossible for these complex ores to increase their tonnage and become a controlling factor in the zinc market. In addition to these complex ores, two extensive fields of complex ores are being developed in Canada, one at Sudbury and the other in Quebec. The southeast Missouri lead district is producing 59,000 tons of zinc annually as a by-product, their lead ore having been formerly penalized for its zinc content. As this tonnage equals about 2 per cent of the total yearly production of the Tri-State district, its effect must be considered. The possibilities of all these fields having lower production costs constitutes a serious threat against the supremacy of the Tri-State area in the zinc-production field.

British capital is exploring and developing certain regions in South Africa, which, according to authoritative reports, have splendid prospects. The African field, however, may not materially influence the domestic market and consumption in the United States, but it will probably affect the American export shipments of concentrate intended for use by the British and Continental smelters.

At the beginning of the seventh month of 1914, an upward trend in the price of zinc concentrate started, continuing with violent fluctuations during 1915 until March of 1916, when the high point of approximately $110 per ton was reached. During the year 1916, ore dropped to $59 per ton and then rose to about $90, which is the highest point zinc blend has reached since 1916 (see Chart I).

Beginning in January, 1917, there was a decline in the price of concentrate throughout the entire year, and this decline ex-

tended through the first five months of 1918. There was a slight recovery in 1919, bringing the price of concentrate back to approximately $62 per ton, after which the price dropped in the greatest slump of 1921, to about $22 per ton.

At the close of 1925, the price of concentrate had climbed to approximately $57 per ton. For the year 1926, there was a continued decline in the price of zinc concentrate to approximately $46 per ton. During the years 1925 and 1926, according to the cost-of-production sheets submitted by the operators of the Tri-State district, it was necessary to sell the concentrates at $40 per ton in order to cover their costs of production. During the greater part of the year 1927, the producers of the Tri-State district have been forced to sell their concentrate at a price that is either just at, or below, their cost-of-production figure. In examining the reasons for this decline in the price of ore, one must look as far back as the beginning of the war in Europe, which made excessive demands upon the entire mineral industry. These demands caused properties that had been shut down because they yielded a low-grade ore to be reopened and worked under intensive programs. Also, just prior to the war, in the northeast corner of Oklahoma, the great Picher section of the Tri-State field was opened, destined to be the source of enormous tonnages. The entire Tri-State district continued to operate on an extensive scale until the slump or the decline in 1921; then, with the recovery in 1925, to resume operations with almost the same magnitude as during the war.

During the week of February 6, 1927, the Tri-State district produced 19,000 tons of zinc ore, the largest amount of ore produced in one week in the history of the district. One hundred and eighty-one mills were operating, and new mills were being opened each week. When ore production reached this new level in tonnage, the price of zinc ore began its downward movement from the last high mark. The price was approximately $50 per ton and had remained near that point for several months. The low level was $35 for prime western zinc, late in 1927. The operators of the Tri-State district alleged that the cause of the decline in price was due to overproduction, and they stated that

any quantity of ore above 17,000 tons per week was overproduction.

A wide difference exists between the market of the operator, who is a seller, and the market of the smelter, who is a buyer. The allegation of the ore-producers was inaccurate in that there was not more ore than could be sold but more ore than could be sold at a price which would yield a profit based on their costs of production. Such a maladjustment between these two contending markets frequently happens when the production is increased more rapidly than the products can be absorbed in the regular channels of industry.

In any district, such as the Tri-State, one will find the quality of the ore-bodies varying in different sections of the field. Some mines have yielded ore as high in grade as 30 per cent zinc, but others have a tenor as low as 2½–3 per cent. When a mining company has an ore body that will yield 30 per cent ore, it need not worry over the price of concentrate; while the mine that yields only 3 per cent ore can operate only under the most favorable conditions. The product of these low-grade mines goes a long way in determining the price of ore.

The ore reserve is the asset of the mine; and once depleted, this ore reserve cannot be replaced. Certain principles of accounting have been introduced to protect the investor which allow the operator to deplete and to depreciate his holdings until by the time the ore reserve is exhausted, the owner or investor will have had his investment returned to him.

In every producing organization, whether business or mining, there are four factors which influence production, as this term is used in economics. These factors are land, labor, capital, and the entrepreneur or manager. Land receives, as its return, rent; labor, wages; capital, interest; and the entrepreneur, wages of management. All these factors are considered in the operation of a mine: a given amount of land is taken in the form of a lease; a given amount of labor is used to develop the lease and to operate the mine; a given amount of capital is expended also in the process of development; and the entrepreneur re-

ceives his wages of management, which is the least amount of profit that will induce him to operate.

As has been stated, the chief asset of the mine is its ore body, and it is an unwise mine-operator who so operates his mine that the four factors of production are merely satisfied. The smaller operator, usually operating a low-grade ore body, often continues to operate at a loss, or at least without a reasonable profit, in the hope that his ore bodies will improve or the price of ore will rise. The operation of these marginal mines exerts considerable influence on the price of ore. The marginal mine may not be located in the Tri-State district but in the western field, or in Australia, or in some other zinc-producing section.

Of course, such conditions are looked upon as something to be expected in mining activities; but as long as the small operator exists, whether he be operating a no-rent or marginal mine, and will continue to operate this mine in the hope that either the price of ore will rise or the quality of his ore-body will improve, the large operators, who run their mines on sound business principles and are careful to keep production at a level that will not flood the market, will find themselves seriously handicapped in their attempts to control or limit production.

The Tri-State district perhaps is blessed with more "shoestring" operators than any other one district; this condition is caused, no doubt, by the ease and cheapness with which operations may be undertaken, and in large measure by the prevalence of stories of large profits made by operators who have taken over and resumed operation of abandoned properties. As long as men are optimists and will try to wrest a fortune from an abandoned property, without regard to the soundness of their business policies, the larger and more stable operators will find limitation of production and control of price an impossibility. If it were possible to cause these men to see the "light," and induce them to operate on sound business principles, as do the larger operators, then it would be possible really to control and dominate the market.

The leading operators, realizing the seriousness of many of

their problems, turned to the trade-association idea as a means of solving them. Some of the operators believed the trade association to be the panacea which would cure all their ills, and an organization known as the Tri-State Lead and Zinc Ore Producers' Association was perfected before the present crisis had its inception. As to the success of this association opinions differ. Its influence, or lack of influence, on the district is set forth in the subsequent paragraphs.

The Tri-State Lead and Zinc Ore Producers' Association was organized in October of 1923. Its objects, as set forth in its constitution, are:

> (1) To promote the common interests of its members by ethical and lawful means; (2) to collect, compile, and record all available data and statistics touching or concerning the production or consumption of zinc and lead ores; (3) to cooperate with the authorities of the government in the administration of the laws affecting directly or indirectly, the zinc and lead mining industry in the Tri-State district, composed of parts of the states of Oklahoma, Kansas, and Missouri, wherever and whenever such cooperation is desired and requested; (4) to disseminate by publication and other means information of general interest concerning or affecting the economic conditions of zinc and lead mining in the said district.

Prior to the decisions of the Supreme Court in the cases of the Cement Manufacturers' Association and the Maple Flooring Manufacturers' Association, which were handed down in 1925, trade associations were generally looked upon with disfavor by the United States government, as one of the means of restraining trade. A large number of industries have become more closely united through these trade associations which have been created for the purpose of improving the conditions found in their businesses. These conditions may be production, marketing, sales, finance, or a combination of any of these that has caused the development of these associations.

The mining district in which this association was organized has certain interesting peculiarities. There mining operations are carried on by over one hundred separately organized companies. The nature of the ore bodies in this district requires operations on small-acreage units which would give approximately two hundred mines fully equipped with concentrating machinery at a considerable capital outlay. The mining acreage

which is held by lease generally requires continuous operation due to the text of the lease. This is one mining district that does not contract its output over a period of time but rather sells its output weekly to representatives of the smelter in the open market. It has been frequently suggested by the mine operators that there is no open market and that competition is not evidenced in the prices offered. The smelter through its agent, the ore-buyer, insists that the increased costs of smelting are rapidly wiping out the margin between the price paid for the concentrate and the price received for the finished product. The peculiarities mentioned above and the declining price of zinc concentrate caused the organization of this association in an attempt to stabilize the market for zinc concentrate. If the contention of the smelter and of the operator is correct, we have a remarkable phenomenon existing in a great industry rapidly exhausting a valuable natural resource without appreciable profit to either branch of that industry.

In clarifying the law concerning the activities of such trade associations, the Supreme Court, in deciding the case of *Maple Flooring Manufacturers' Association et al.* v. *U.S.*, 268 U.S. 563, said in part:

> It is not, we think, open to question that the dissemination of pertinent information concerning any trade or business tends to stabilize that trade or business and to produce uniformity of price and trade practice. Exchange of price quotations of market commodities tends to produce uniformity of price and trade practice. Exchange of price quotations of market commodities tends to produce uniformity of prices in the markets of the world. Knowledge of the supplies of available merchandise tends to prevent overproduction and to avoid the economic disturbances produced by business crises resulting from overproduction. But the natural effect of the acquisition of wider and more scientific knowledge of business conditions, on the minds of the individuals engaged in commerce, and its consequent effect in stabilizing production and price, can hardly be deemed a restraint of commerce, or, if so, it cannot, we think, be said to be an unreasonable restraint, or in any respect unlawful.
>
> It is the consensus of opinion of economists and of many of the most important agencies of government that the public interest is served by the gathering and dissemination, in the widest possible manner, of information with respect to the production and distribution, cost and prices in actual sales, of market commodities, because the making available of such information tends to stabilize trade and industry, to produce fairer price levels,

and to avoid the waste which inevitably attends the unintelligent conduct of economic enterprise. Free competition means a free and open market among both buyers and sellers for the sale and distribution of commodities. Competition does not become less free merely because the conduct of commercial operations becomes more intelligent through the free distribution of knowledge of all the essential factors entering into the commercial transaction.

This association was to act as a clearing house or bureau of information for the distribution of data to the ore-producers of the district and to the mining industry of the field. The statistical data was collected each week, and figures were compiled showing the operating cost which included labor, supplies, liability insurance, explosives, exploration and development, all classes of power consumed, fire and tornado insurance, management and office salaries and expenses, taxes excluding the federal income tax, amortization of capital costs, plant and equipment depreciation, royalties, miscellaneous costs, and the number of rock tons hoisted per man per day. This statistical data was further compiled to show the percentage of operation cost, cost per ton of concentrate, and cost per ton of rock hoisted in terms of percentage and fractional parts of a dollar for each of the above listed items.

The primary object of this statistical data of the ore-producers' association was to furnish the ore-producer information which would be valuable to him in conducting his business on a more efficient basis. It was also the intention of the association to study the factors involved in the market and the conducting of the operations of the operator with the idea in view of making for maximum profits rather than merely "digging dirt."

The other questions to which the association has directed its attention are taxation, tariff, workmen's compensation, and mining codes; but of these, taxation has been given the greatest consideration, and there has been close co-operation between the American Mining Congress, through McKinley W. Kreigh, secretary, and the Ore Producers' Associations.

The condition of the metal market and the enormous tonnages produced by this and other fields has been effective in the prevention of the stabilization of the market which the members of this association anticipated.

In constructing the membership of the Association, all organizations producing lead and zinc ore in the district which were directly or indirectly connected with the smelters were denied membership. It was the opinion of the producers not having smelter connections that the market was under the control of powerful influences and subject to manipulation and that there was no open competitive market as has been mentioned above; hence, the formation of the ore-producers' association to combat this lack of competitive bidding for concentrate. The elimination of the companies having smelter connections removed from the council tables of the ore-producers' association some of the companies producing the largest tonnages. A more serious loss was the sound advice which the many years of experience in the mining field of the district would have enabled their representatives to give.

The members of the Association reside in the various towns of the district. Because of the difference in locality of the residence of the members, opposing interests arise and certain controversies have developed and found their expression in the meeting ground of the members at Picher, Oklahoma, where the Association maintains its headquarters. The extent of these controversies and petty jealousies may not be as important as one may think, but on a number of occasions these conflicting interests have worked to the detriment of the association.

A field in which the ore-producers have succeeded in their purpose is accident prevention, and the result of their safety engineering has had a marked influence in decreasing the liability-insurance rates.

The ore-producers' association has been under the surveillance of the federal government and has not as yet been charged with violation of the anti-trust laws.

The enormous production or so-called "overproduction" by the trade association, which was the greatest tonnage production since the peak in 1916, has been the source of consequent annoyance to the ore-producers of the district, and this association; and whatever their efforts may have been, they have been unable to secure for the ore-producers of the district the price at which they can market their product with a reasonable profit.

It is doubtful if the information which has been "collected, compiled, and recorded" is the basis for the solution of the problems of the Tri-State district.

The demands of the ore-producers' association for a stabilization of the industry in a reasonable manner, the elimination of cutthroat competition, fair profits to the ore-producer and smelter, steady employment and good wages to the workmen, are very praiseworthy; but one must seek other than praiseworthy goals to remedy so great an economic maladjustment as this.

The interests of the independent ore-producer and the ore-producing smelter-connected operators are at wide variance; and until they can be worked out, the mere collecting of statistical data and the reiteration of their purposes will not eliminate the difficulties. The Association is to be commended, however, for its accident prevention work; but on the other hand, it is doubtful if the collection of statistical data and the publication of average costs of production are as valuable as the officers would have one believe.

It has been said by experienced mining engineers that average costs in mining are of little value because of the lack of similar conditions existing in other mines and because of the probability that a like set of conditions would not exist again in the same mine.

During the prosperous years of 1925, the operators of the district who were members of the Association were taxed for their membership according to the tonnage of concentrate they produced, and were able to build up a strong financial reserve for the Association which would pay operating costs of the Association, including salaries, and build a clubhouse and offices in Picher, Oklahoma. The Tri-State Zinc and Lead Ore Producers' Association will not function for the best interests of the district until it has admitted to membership the smelter-connected operators who are producing the greatest tonnages in the district, and until it has reviewed more carefully its economics and has worked out a greater spirit of co-operation within the district.

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MISSOURI SCHOOL OF MINES AND METALLURGY

RESULTS FROM THE USE OF OBJECTIVE TESTS AND QUESTIONNAIRES IN A COLLEGE COURSE ON "THE ECONOMIC ORDER"[1]

I

I. OBJECTIVES AND PROCEDURE

A NEW introductory course in economics was adopted at the University of Chicago in 1926–27. It was decided that an attempt should be made to secure some objective measurements of the course accomplishments from the very beginning, though the preliminary and experimental character of this initial test work was well recognized. The present paper contains a report of this first year's experimentation.

The nature of the new course is sufficiently indicated by the descriptive paragraph printed in the University *Announcements:*

> The Economic Order I, II, III.—This course presents a general survey of the economic order: its structure, its institutions, its operations. The first part of the course deals with technology and the economic order; the second, with the co-ordination of specialists; and the third, with the guidance of economic activity. . . . . Open to first-year students.

The course runs through the year (three quarters), but students are permitted to take the work of only one or two quarters if they desire. Instruction is built around a printed syllabus of some four hundred pages devoted to brief introductory statements of the purposes and content of each section, and to lists of questions and problems. A large amount of assigned reading is required in such books as the following: Black, *Production Economics;* Chase and Schlink, *Your Money's Worth;* Clark, *Principles of Marketing;* Clark, *Social Control of Business;*

[1] The material reported here is distinctly a group product. The work received its impulse from, and was made possible by, Mr. L. C. Marshall. The tests were prepared largely by Mr. R. J. McReynolds, with the aid of Messrs. G. V. Cox, L. C. Marshall, L. W. Mints, S. H. Nerlove, and the writer. The careful statistical work of Mr. W. Regennitter and Miss Ruth Geisman and the willing co-operation of all the instructors in the course, have also been most helpful.

Edie, *Economics: Principles and Problems;* Fairchild, Furness, and Buck, *Elementary Economics* (or similar books by Ely, Johnson, Seager, Taussig); Hamilton, *Current Economic Problems;* Hardy, *Risk and Risk Bearing;* Marshall, *Readings in Industrial Society;* Marshall, *The Story of Human Progress;* Marshall and Lyon, *Our Economic Organization;* Marshall and Wiese, *Modern Business;* Moulton, *Financial Organization.*

In embarking upon the use of tests we had several purposes in mind. Chief among the objectives for the test work of the first year were these:

1. Through experiment with tests, to make possible the development of better test material and more effective plans of inquiry in subsequent years.

2. To secure some knowledge of the economic information and attitudes of students at the beginning of the course. This information should be helpful in planning appropriate course content and procedure when the course is revised.

3. To ascertain the effect of the course on the economic knowledge (in general and on specific points) and attitudes of students, and on their opinions of the course. This information should be helpful in evaluating and improving the course and in comparing accomplishments from year to year.

4. To determine the value of tests given at the beginning of the course as predictions of students' achievement. This should throw light on the problem of selecting students and of grouping them into sections on the basis of abilities.

5. To discover the relationship of objective test scores to traditional grades (and to the elimination of students) with a view to the possible use of objective examinations as a partial basis for grading.

6. To compare the accomplishments of different sections and instructors.

7. To determine some of the individual factors related to success and failure in the course, and to the different attitudes or opinions of students.

The procedure followed in attacking the foregoing problems consisted essentially in the use of objective examinations at the

beginning and at the close of each quarter, together with questionnaires, an intelligence test, and records of certain facts about the individual students. The material collected was as follows:

Scores on objective examinations:

Examination A—used at the beginning of the first quarter (autumn), end of the first quarter, and end of the year

Examination B—used at same times as Examination A

Examination C—used at the beginning of the second quarter (winter), end of the second quarter, and end of the year

Examination D—Used at the beginning of the third quarter (spring), and at the end of the third quarter (which is also the end of the year)

Scores on an attitudes blank—used at the beginning and end of the first quarter and at the end of the year

Scores on an intelligence test (Otis Higher Examination: Form B) used once only, in the first quarter

Responses of students to a questionnaire concerning the course and their opinions of it—used at the end of each quarter

Items from the records of the individual students, viz.: (1) Grades in the economics course each quarter. (2) High-school average grades. (3) Whether or not a course in economics was taken in high school. (4) Sex. (5) Age. (6) Religion (and several other items, which were not used in the study)

The data collected through these several means have been examined with a view to finding answers, so far as the material permits, to the questions which are given below. In the present report of results we shall follow the seven-fold division suggested in those questions, considering in turn each question and the evidence which bears upon it. The questions follow:

1. What effect does the course have upon students' knowledge of economics in general and on particular matters?
2. What effect does the course have upon students' economic attitudes or opinions?
3. How well can we predict the relative achievement of individual students in the course?
4. How well do objective-test scores agree with grades in the course?
5. How great are the differences in the effect of the course from one section to another and one instructor to another?
6. What are the reactions of students to the course?
7. What conclusions may be drawn with reference to the course and with reference to further measurement work?

II. CHANGES IN ECONOMIC KNOWLEDGE RESULTING FROM THE COURSE

The initial question which we are to consider is that which asks what effect the course has upon students' knowledge of economics. The data bearing upon this point are the scores of

TABLE I

AVERAGE SCORES AND QUARTILES FOR EXAMINATION A AT THE BEGINNING AND END OF THE AUTUMN QUARTER—DATA FOR 303 STUDENTS

	Beginning of Quarter	End of Quarter	Improvement
Q_1	41.2	59.0	17.8
Median	52.4	69.5	17.1
Q_3	61.5	80.3	18.8
Q_3-Q_1	20.3	21.3	.....

P.E.'s of the medians (figured roughly from σ on the assumption of a normal distribution curve) are about .7; P.E.'s of the quartiles are about .8.

TABLE II

AVERAGE SCORES AND QUARTILES FOR EXAMINATION A AT THE BEGINNING AND END OF THE YEAR—DATA FOR 151 STUDENTS

	Beginning of Year	End of Year	Improvement
Q_1	45.3	71.7	26.4
Median	55.0	81.8	26.8
Q_3	63.9	92.3	28.4
Q_3-Q_1	18.6	20.6	.....

The P.E.'s here are about 1.0 for the medians and 1.1 for the quartiles.

students on several content tests (Examinations A, B, C, D) which were given at appropriate times during the year. The results are presented for each of the tests separately.

Examination A (special reference to Autumn Quarter).—The first and most general statement to be made is that on Examination A (and on all the other content tests) significant improvement in the average scores of students does occur. The extent of the changes may be judged from the summary figures in Tables I and II.

Examination A consisted of 129 statements to be marked

"true" or "false." The score is the number correctly marked minus the number incorrectly marked. Hence the highest possible score is 129; the lowest assigned score is zero (though theoretically negative scores are obtainable). The test material refers primarily to the subject matter of the Autumn Quarter, though some attempt is made to tap other ranges of economic information as well. A few typical items from the test follow:

1. Vegetables and fruit are almost always marketed through co-operative associations
2. Scientific management fairly apportions rewards in industry, for it measures accurately what capital, labor, land, and management produce
3. The chief function of banks is to receive deposits
4. Italy possesses little coal and iron, which accounts for the slight development of her industries
5. People who receive their incomes from interest on bonds are benefited by a fall in the price level

In the Autumn Quarter the average score rises from 52 to 69 for the group as a whole. For students who remain through the year, the average initial score is 55; the end of the year sees this improved to about 82. The amount of improvement thus revealed appears to be considerable, but in the absence of any standards with which to compare the present data, little more can be said.

Marked differences between the better and poorer students are shown in the level of performance both at the beginning of the year and in the later tests. Thus it will be noted that the top 25 per cent of the students were better informed when they entered the course than were the lowest 25 per cent at the end of 3 months' instruction. Ten per cent of the students made scores on the first day higher than the *average* score at the end of the quarter. Three students out of 151 were higher at the start than was the average student at the end of the entire year. Similar data looked at from the other side show that four students at the end were lower than the average student at the beginning.

The correlations are fairly close between initial standing in the examination and later standing. For beginning scores and scores at the end of the quarter the correlation coefficient is .75; for beginning and end of the year it is .55; and for end of first

quarter and end of the year it is .67. Students tend to retain somewhat the same relative standing, that is, as the whole group moves upward.

Many individual exceptions occur, however, as may be seen when we look at the changes in score, individual by individual. The percentage distribution of these individual improvement scores is shown in Table III. It is noteworthy that in the Autumn Quarter some 7 per cent of the students actually show a *decrease* in economic knowledge as measured by the test. One student in a hundred is even worse at the end of the whole year's study than he is at the beginning. Variations are perhaps no less

TABLE III

PERCENTAGE DISTRIBUTION OF IMPROVEMENT SCORES OF INDIVIDUAL STUDENTS ON EXAMINATION A

	AMOUNT OF IMPROVEMENT								
	−20 to −10.1	−10 to −.1	0 to 9.9	10 to 19.9	20 to 29.9	30 to 39.9	40 to 49.9	50 to 59.9	60 to 69.9
Autumn Quarter	1	6	18	28	34	11	2	1	0
Year	0	1	8	19	32	21	12	6	1

striking at the upper extremes where, for example, 7 per cent of the students increase their scores by 50 points or more during the year, while about half the students improve less than 25 points.

The varying amounts of improvement, however, bear no relationship to the extent of the individual's economic knowledge at the outset. The correlation between initial test score and improvement score is —.01. This finding furnishes further corroboration for the statement that students retain somewhat the same relative standing as the whole group moves forward. Apparently the course did not enable only the good students or only the poor ones to profit. The students who begin with less economic knowledge do, however, show greater improvement *relative* to their starting level.

Now what do our data show regarding the economic knowledge and improvement of students at different levels of intellectual ability and of different degrees of success in the course? To

answer this question we may compare the scores on Examination A with intelligence test scores (Otis test) and with grades in the course. These relationships are shown by the correlation coefficients in Table IV. The Otis test correlations indicate rather definitely that there is not a leveling down process in the course —a condition, that is, of the sort often alleged to be a common curse of college instruction, wherein the superior students make less progress than the poorer students. The contrary tendency, in fact, appears. This is shown both by the positive, though low, correlations between the Otis test and improvement scores (the

TABLE IV

COEFFICIENTS SHOWING CORRELATION OF SCORES ON EXAMINATION A WITH INTELLIGENCE TEST SCORES AND GRADES IN THE ECONOMIC ORDER COURSE

	Otis Test	Autumn Grades	Year Grades
Examination A			
Beginning of year	.38	.35	.41
End of Autumn Quarter	.47	.48	.....
End of year	.51	.....	.41
Improvement during Autumn Quarter	.13	.12	.....
Improvement during year	.21	.....	.09

more intelligent students improve more), and by the increasing size of the coefficients between the Otis test and the content examination as we pass from the beginning to the end of the year (ability and knowledge come more nearly to coincide).

The students who receive the higher grades in the course tend on the whole to be those who have more economic knowledge as measured by the content examination, both at the beginning and at the end of the course. There is also a very slight tendency for them to show greater improvement in knowledge during the course. These correlations are surprisingly low however. While the absence of closer relationships may be due in part to the unreliability of grades or test scores or both, an important part of the explanation apparently is that grades are based upon a variety of qualities in addition to the student's knowledge. It is especially doubtful whether *improvement* is

much considered in assigning grades. The similarity of the correlations for the Otis test and for grades might suggest that grades and the intelligence scores are very intimately related. The correlation, however, is only .34 in the Autumn Quarter and .33 for the year.

We have not mentioned up to this point what is probably the most interesting and perhaps the most useful part of our material on changes in economic knowledge, namely the study of responses to the individual items of the test blank. Analysis of these individual items is particularly significant in determining what background of economic knowledge students can be assumed to possess (their initial performance on the test), and

TABLE V

AVERAGE PERCENTAGES OF RIGHT, WRONG, AND OMITTED RESPONSES ON ITEMS OF EXAMINATION A

	Beginning of Year	End of the Quarter	End of the Year
Percentage right....	63	74	81
Percentage wrong...	24	20	16
Percentage omitted..	13	7	3

wherein the course is succeeding or failing in bringing about improvement in knowledge.

By the nature of the analysis, we are unable to do more than mention a few summary figures and then cite some illustrations. The percentage of answers right, wrong, and omitted was calculated for each of the 129 items. The averages of these percentages for all the items are given in Table V.

The percentage of correct answers on the separate items varied from 100 per cent to 8 per cent. At the first testing, 67 per cent of the questions were answered correctly by more than 50 per cent of the students; at the end of the quarter, 81 per cent were answered correctly by more than 50 per cent; and at the end of the year the figure had risen to 90 per cent.

For each item, the increase during the year in the percentage of students answering correctly was figured. These changes from the first to the last taking of the test, range from a *decrease* of 4

per cent to an increase of 56 per cent. Two thirds of all the items show a rise in the percentage of 5 to 30 points.

The items on which little or no improvement occurred are largely those which were too easy (passed by 90 per cent or more of the students at the beginning) and those which covered points not specifically dealt with or emphasized in the course.

The seventeen items on which most improvement occurred (percentage increase over 30 points) are as follows (the numbers after each item indicate the percentage of correct answers at the beginning of the year, the end of the first quarter, and the end of the year respectively).

1. Large-scale production is always more economical than small-scale production	18	43	72
2. All the risks of industry are borne by the entrepreneurs	43	66	82
3. Telephones and telegraphs are regulated by neither state nor federal governments	39	62	75
4. Individual advantage is always antagonistic to social advantage	42	55	79
5. The selling of goods abroad at a cheaper price than they are sold at home is encouraged by the formation of trusts and enactment of protective tariffs within the seller's country	43	54	74
6. People who receive their incomes from interest on bonds are benefited by a fall in the price level	18	24	55
7. The use of more labor and machinery on land results in a proportionate increase in the product	11	56	67
8. Labor unions oppose collective bargaining and most employers favor it	44	71	87
9. Minimum-wage legislation applies to many workers in a majority of the states	25	34	55
10. An increase of wages necessarily means higher labor costs	25	46	56
11. Competition today is unrestricted	44	65	86
12. Large indirect costs favor large-scale production	43	79	85
13. The "domestic system" of manufacture was that carried on by village and rural artisans, in the main, for a capitalist who supplied the raw materials to them	52	83	89
14. Large-scale operations inevitably pass over into monopoly production	40	67	79
15. Automatic machinery and specialization eliminate fatigue in industry	34	68	79

16. Property is not merely a right; it is a bundle of rights	67	95	98
17. Pipe lines are common carriers and are regulated by the Interstate Commerce Commission	46	66	82

On the whole these statements are probably more general and represent more significant points than the items where little improvement was shown, though this is by no means true of every member in the list. The items just given are apparently different primarily, however, in that they are not as readily answered from one's general knowledge or experience as were the easier ones of the other group; and second, and more important, they are on matters more fully and adequately considered in the course. Many of these items present statements which are not free from criticism. Items 2 and 16, for example, probably show improvement largely by reason of the students' having become familiar with the word "entrepreneur" and with the application of the phrase "bundle of rights" to property. Many students doubtless reacted to statement 7 simply as the opposite of the law of diminishing returns, without being bothered by the inadequate wording. Item 12 similarly is annoyingly worded, with its implication of a very dubious causal relationship.

A number of other somewhat general or significant items from the test showed good improvement, though a little less marked than that of the preceding list. Several of these items are here given:

1. The less developed specialization is, the more dependent men are upon their fellow-men	71	84	96
2. The consumer is the ultimate director of social energy in present society	77	88	95
3. The worker is subject to the insecurities of his employer and to some other insecurities as well	74	95	98
4. Since the market makes no distinction between the dollar saved by the rich and that saved by the poor, it follows that saving implies a uniform sacrifice by all classes	62	76	87
5. Private property is a matter of custom and law	72	92	99

Even on these items of the last two lists, where marked improvement occurs and where points of some significance are involved, the final percentage of correct answers is rarely close to

one hundred. Only five of the 22 items are answered correctly by more than 90 per cent, while five others show less than 75 per cent right. (It is to be kept in mind that 50 per cent can be "guessed" correctly.) Apparently there is still opportunity for further improvement, in spite of the considerable increases shown.

In general, the results from Examination A indicate a real and measurable improvement in students' knowledge. Some students make far more progress than others, but there is little relationship between the increase in knowledge and the student's intelligence, his knowledge of economics at the beginning of the course, or his final standing in the course. Students tend to remain in about the same position relative to one another, as the whole group moves upward. These conclusions, strictly speaking, have reference only to the particular economic knowledge included in our examination. In spite of the fact, however, that many of the individual test items proved to be inappropriate, too easy, or lacking in clearness, a sufficiently respectable group remained to warrant the belief that the examination served roughly to sample the range of economic knowledge in which we were interested. The examination itself needs to be thoroughly revised, but results on many individual items are none the less significant indicators of the points where the course is producing, or failing to produce, extensive changes in students' knowledge.

Examination B.—An attempt was made in Examination B to measure students' ability to apply their economic knowledge, by asking them to distinguish between sound and unsound arguments, explanations, or reasons pertaining to economic questions. On each of ten issues five alternative judgments were set down, from among which the student was to choose the one most nearly true. Several of the items on which the greatest improvement occurred during the year are reproduced below. Following each possible answer are given the percentages voting for it at the beginning of the year, end of the first quarter, and end of the year.

1. When persons who do not need the money earn wages or salaries—as is often done by daughters of well-to-do families, for example—it is			
a) Wrong, for this means less work for those who really need it	15	12	7
b) Well, for in the process they give society a larger supply of goods and services, and hence increase the social wealth	27	56	73
c) Wrong, for they are not dependent for support upon their earnings and will neither organize nor otherwise act to secure a decent wage for working people, thus making the industry "parasitic"—one that lives off other industries	6	5	6
d) Well, for they will in time convince the workers that the capitalistic or wealthy class is neither unjust to the workers nor idle	18	4	4
e) Well, because more welfare work in industry will result from their participation, due to the fact that they are independent and will not tolerate bad conditions	35	21	8
2. *a*) Education ought not to be supported at government expense. It is no more important than food and clothing, and, as in the case of other goods, its production and distribution should be left to action by individuals	1	1	0
b) Education ought not to be supported at government expense. Free education results in students loafing much of the time and the country loses from education more than it gains, whereas the students who pay the full expenses of their education are more in earnest	14	8	7
c) Education ought to be supported at government expense because this will enable everyone to escape dirty, disagreeable, and poorly paid tasks	6	6	3
d) Education ought to be supported at government expense. It is no more important than food and clothing yet its production and distribution should not be left to action by individuals for many people will not pay for as much of it as they should get	46	60	73
e) Education ought to be supported at public expense for it improves politics, since bad political conditions are caused by ignorant, uncultured, and otherwise uneducated persons	35	25	18

3. The Great Japanese earthquake was			
a) An economic benefit to Japan because it created a lively demand for labor and materials	15	11	1
b) An economic disaster to Japan because it destroyed much goods and labor power	7	14	13
c) An economic benefit to Japan because it destroyed many old buildings, thus giving an opportunity to build new and up-to-date structures	13	6	2
d) An economic benefit to Japan because it reduced the population of an overpopulated country	8	10	7
e) An economic disaster to Japan because it became necessary to expend, in restoring a great loss, effort which might have been expended in making progress	56	58	75
4. A protective tariff may be a good thing for the country even if it does make consumers pay somewhat more for goods; for			
a) If Americans buy European products, America has the goods and Europe has the money; whereas if Americans buy American goods, America has the goods and the money both	14	7	2
b) It increases the national wealth	8	7	2
c) It gives employment to more labor, capital, land, and management	31	28	12
d) It may encourage the development of infant industries which will give cheaper goods in the future and may make the nation self-sufficient for war	39	49	79
e) It concentrates wealth in the hands of those who reinvest it in industry instead of using it for consumption	8	7	2
5. The price of farm products in the long run will be			
a) High enough to yield a reasonable return on the value of the land in addition to other costs of production	54	61	23
b) High enough to yield wages and a fair profit on capital to the cultivator of the poorest land necessary to produce the last unit of product required	17	26	68
c) Low enough that there will be no rent paid for the land	1	0	3
d) High enough that the farmer can support himself from his profits when he retires	0	3	1
e) Low enough that all can afford to buy the qualities of them they need	18	8	2

Of the five remaining items on the test, two showed a fair amount of improvement; two were too easy; and one item missed

fire, either because it cannot be answered unequivocally or because the underlying principle was not made part of students' thinking.

The average percentage of right answers for all ten items runs as follows: Beginning of year, 54 per cent; end of first quarter, 62 per cent; end of year, 78 per cent. This reflects considerable improvement during the year, but no standards are available by which to judge the satisfactoriness of this amount of change. It is to be noted that even on the five items given in detail above, less than three-fourths of the students responded correctly at the close of the year. This clearly does not reflect the greatest imaginable improvement.

TABLE VI

AVERAGE SCORES AND QUARTILES FOR EXAMINATION B AT THE BEGINNING AND END OF THE AUTUMN QUARTER—DATA FOR 294 STUDENTS

	Beginning of Quarter	End of Quarter	Improvement
Q_1	4.78	5.63	.85
Median	5.92	6.91	.99
Q_3	7.07	7.93	.86
Q_3-Q_1	2.29	2.30	.....

P.E.'s of the medians (figured roughly from σ on the assumption of a normal distribution curve) are about .08; of the quartiles about .09.

TABLE VII

AVERAGE SCORES AND QUARTILES FOR EXAMINATION B AT THE BEGINNING AND END OF THE YEAR—DATA FOR 154 STUDENTS

	Beginning of Year	End of Year	Improvement
Q_1	4.98	7.38	2.40
Median	6.03	8.45	2.42
Q_3	7.17	9.55	2.38
Q_3-Q_1	2.19	2.17	.....

The P.E.'s here are about .11 for the medians and .12 for the quartiles.

Scores for individual students on this test have a possible range from 0 to 10, since the score is simply the number of correctly checked items. The distribution of the individual scores

and the amount of improvement they show on the average may be seen in Tables VI and VII.

As in the case of Examination A, marked differences are to be observed in the level of knowledge of the various students. The highest 25 per cent of the students were better at the beginning of the course than was the average student at the end of the first quarter, and they did very nearly as well as the poorest 25 per cent were able to accomplish at the completion of the year.

The correlation of initial standing in the test with later scores is positive but not particularly high. The beginning scores correlate .42 with scores at the end of the quarter and .41 with the final scores of the year. The variation in amount of improvement is brought out in the figures of Table VIII.

TABLE VIII

PERCENTAGE DISTRIBUTION OF IMPROVEMENT SCORES OF INDIVIDUAL STUDENTS ON EXAMINATION B

	AMOUNT OF IMPROVEMENT										
	−3	−2	−1	0	1	2	3	4	5	6	7
Autumn Quarter.....	1	7	11	25	24	16	10	4	2	0	(.4)
Year.....	....	....	6	12	12	23	23	14	8	3	....

Nineteen per cent of the students have a *negative* improvement score for the Autumn Quarter, and for the whole year 6 per cent likewise show a *decrease* in economic knowledge as reflected in the judgments of Examination B. For students who answered six items correctly at the beginning of the year—the average score—an improvement of four points is the maximum. Hence it is not surprising to find comparatively few students improving more than three or four points.

The relationship between initial test score and individual improvement is quite different in the case of Examination B from that found in the preceding test. Here the relationship is expressed in a negative correlation of −.61. A pronounced tendency exists, that is, for students with low test scores to improve most. To a considerable extent this finding is clearly an artifact, due to the restricted upper possibilities on the test. It may in some measure, however, reflect a condition of instruction in

which students with poor knowledge of economics to begin with benefit more than the better-equipped students. This conclusion, since it runs counter to the evidence of Examination A, would have to mean that the relationship is partly determined by the particular form or content of the examination—a not unreasonable possibility.

Correlation coefficients are presented in Table IX to indicate the relationship between standing on Examination B, and intelligence and success in the course. The correlations are all lower than the corresponding ones for Examination A. Moreover the present figures do not particularly support the conclusion reached with regard to Examination A, to the effect that the more able

TABLE IX

COEFFICIENTS SHOWING CORRELATION OF SCORES ON EXAMINATION B WITH INTELLIGENCE TEST SCORES AND GRADES IN THE ECONOMIC ORDER COURSE

	Otis Test	Autumn Grades	Year Grades
Examination B:			
Beginning of year	.27	.18	.22
End of Autumn Quarter	.31	.29	.....
End of year	.02	.....	.19
Improvement during Autumn Quarter	.04	.12	.....
Improvement during year	—.12	.....	.....

students improve more. For Examination B the relationship, if significant at all, seems to be that the better students improve a little less than the poorer ones. With so few items on the test, however, it is possible that this result is due entirely to one or two instances of ambiguously worded statements.

Results from Examination B, in general, agree with those of Examination A in the reflection of a considerable degree of improvement in economic knowledge during the year, but in this B test the initial and final scores and measures of improvement are all even less closely correlated with intellectual ability and scholastic grades than was the case with Examination A. Initial and final scores also correlate less closely for Examination B, probably due in part at least to the greater unreliability of a test containing so few items. A rather high negative correlation between initial scores and improvement was found, due in part at least to

the limited range of the test. While several of the test items are again found to be poor, others apparently get at more or less significant matters covered in the course and serve to show the extent to which improvement is or is not taking place.

Examination C (special reference to Winter Quarter).—At the beginning and end of the Winter Quarter a test consisting of seventy multiple choice items was given. The student was asked to choose from four alternative ways of completing a statement that one which seemed to him most nearly true. His score is

TABLE X

AVERAGE SCORES AND QUARTILES FOR EXAMINATION C AT THE BEGINNING AND END OF THE WINTER QUARTER—DATA FOR 196 STUDENTS

	Beginning of Quarter	End of Quarter	Improvement
Q_1	32.7	41.7	9.0
Median	37.0	45.7	8.7
Q_3	40.6	49.1	8.5
Q_3-Q_1	7.9	7.4	.....

P.E.'s (figured as for earlier tables) are in the neighborhood of .4 for both medians and quartiles.

simply the number of correct choices out of the seventy chances. A few sample items are:

1. Exchange of goods for goods without use of, or calculation in terms of, money is: (1) the price system; (2) the credit system; (3) barter; (4) socialism
2. The chief method used by an individualistic society in apportioning social resources is: (1) losses; (2) authority; (3) competition; (4) insurance
3. The rate of interest banks charge on loans is determined chiefly by: (1) the size of bank deposits; (2) the condition of business; (3) the capital of the bank; (4) the desire of the bank for profits

The extent of change in economic knowledge as measured by Examination C is indicated by the summary figures of Tables X and XI. Marked differences are again apparent between the lowest and highest divisions of the group, and again the improvement is considerable at all levels.

The distribution of individual improvement is shown in Ta-

ble XII. Five per cent of the students are poorer at the end of the Winter Quarter than at the beginning, and one student in a hundred is poorer after two quarters than at the outset. However, the general run of improvement appears to be reasonably

TABLE XI

AVERAGE SCORES AND QUARTILES FOR EXAMINATION C AT THE BEGINNING OF THE WINTER QUARTER AND AT THE END OF THE YEAR—DATA FOR 167 STUDENTS

	Beginning of Quarter	End of Year	Improvement
Q_1	33.2	45.8	12.6
Median	37.4	50.0	12.6
Q_3	40.8	55.9	15.1
Q_3-Q_1	7.6	10.1	.....

P.E.'s are about .5 to .6.

large, amounting in many cases to two or three times the interquartile range of the initial scores. But no standards are at hand by which to appraise the improvement.

Correlations between initial and later standing in the test are positive but less marked than in Examination A. Scores at

TABLE XII

PERCENTAGE DISTRIBUTION OF IMPROVEMENT SCORES OF INDIVIDUAL STUDENTS ON EXAMINATION C

	AMOUNT OF IMPROVEMENT										
	−6 to −3.1	−3 to −.1	0 to 2.9	3 to 5.9	6 to 8.9	9 to 11.9	12 to 14.9	13 to 17.9	18 to 20.9	21 to 23.9	24 to 26.9
Winter Quarter	1	4	9	14	23	22	13	9	4	1	....
Two quarters	....	1	8	15	18	16	16	16	7	2	1

the beginning of the Winter Quarter correlate .58 with scores at the close of the quarter and .36 with standing at the end of the year.

Initial scores and improvement scores correlate —.54, a relationship similar to that found for Examination B but quite different from the results for A. In the present instance the negative relationship cannot be attributed in any large measure to an artificially restricted upper limit of test scores (as in the case of

Examination B), since few students were close to the maximum score. Even making some allowance for the defects of the test, the results apparently mean that students having more knowledge at the beginning of the Winter Quarter improved less than their fellows with a poorer start—either because of weaker motivation, less opportunity to learn, or greater difficulty in the further matters to be learned. The phenomenon is certainly worthy of further inquiry, but our present data offer no sound basis for interpretation.

Comparisons of the test ratings of economic knowledge with

TABLE XIII

COEFFICIENTS SHOWING CORRELATIONS OF SCORES ON EXAMINATION C WITH INTELLIGENCE TEST SCORES AND GRADE IN THE ECONOMIC ORDER COURSE

	Otis Test	Winter Grades	Year Grades
Examination C:			
Beginning of Winter Quarter	.32	.33	.31
End of Winter Quarter	.40	.36	.....
End of year	.31	.....	.35
Improvement during Winter Quarter	.03	−.04	.....
Improvement during two quarters	−.03	.....	.....

intelligence test scores and with grades in the course are represented in the correlation coefficients of Table XIII. The relationships are about midway between those found for Examination A and for Examination B. There appears in this case to be no correlation, positive or negative, between individual improvement and intellectual ability or scholastic achievement in the course. There is some relationship, though not very close, of absolute test scores with intelligence scores and with grades.

Finally, in picturing the changes in knowledge indicated by Examination C, we come to consider the individual test items. The trend of responses for the items as a whole is shown in Table XIV. The amount of change on the separate items varied from one where the percentage of students answering correctly rose from 37 to 81, to one where the percentages right actually fell 11 points. On two-thirds of all the items, the increase in percentage correct was between 5 and 25.

Nine items on the test either showed no appreciable improvement or were actually answered wrong more often at the end than at the beginning of the two quarters' work. These items are, on the whole, ones that proved distinctly too easy or that appear somewhat ambiguous or questionable. Some slight improvement, at least, was recorded on all the other elements in the examination.

TABLE XIV

AVERAGE PERCENTAGES OF RIGHT, WRONG, AND OMITTED RESPONSES ON ITEMS OF EXAMINATION C

	Beginning of Winter Quarter	End of Winter Quarter	End of Year
Percentage right....	50	62	66
Percentage wrong...	41	36	33
Percentage omitted..	9	2	1

The fourteen items which showed greatest improvement are these:

1. That the losses arising from the uncertainties to which a business firm is subject will be reduced by combining these uncertainties into large groups is: (1) not to be expected; (2) impossible; (3) barely possible; (4) to be expected	54	78	82
2. Rent inevitably exists if: (1) lands of different fertility and different locations are utilized; (2) all the land of the greatest fertility has not been utilized; (3) all the land of similarly desirable locations is not utilized; (4) new lands are discovered	67	93	93
3. A tendency for prices at different times and places to cluster around a certain price or trend of prices is: (1) normal price; (2) competitive price; (3) market price; (4) monopoly price	47	77	83
4. The payments made for the privilege of using the following consists solely of economic rent: (1) a coal mine; (2) a dairy farm; (3) an office building; (4) unimproved virgin land	29	63	64
5. Fiat paper money is redeemable in: (1) gold; (2) silver; (3) government bonds; (4) nothing	37	59	81

6. The supply of labor in a country, from the social point of view, is increased by: (1) unemployment; (2) increase in population; (3) increase of capital; (4) labor unions	14	87	88
7. A tax on economic rent is borne by: (1) the tenants; (2) the land lords; (3) the consumers of goods; (4) the producers of goods	14	50	46
8. The chief measuring device used today in the co-ordination of specialists is: (1) price; (2) competition; (3) profits; (4) losses	22	51	60
9. The chief method used by an individualistic society in apportioning social resources is: (1) losses; (2) authority; (3) competition; (4) insurance	64	73	91
10. Society apportions social energy to itself and denies it to individuals by: (1) competition; (2) taxation; (3) "blue-sky" laws; (4) zoning ordinances	38	54	65
11. "Cheap money drives out the dear." This is: (1) true; (2) false; (3) nonsense; (4) impossible to determine	51	70	79
12. Economic rent would be paid: (1) if some land was situated better than the rest and there was no law of diminishing return; (2) if all lands were equally fertile and unlimited in quantity; (3) if some land was situated better than the rest; (4) if there were sufficient land equally fertile or so situated as to satisfy the demand of all people for land	43	75	84
13. "Addition of paper money increases prices; addition of the supply of gold money does not." This is: (1) impossible to determine; (2) true; (3) false; (4) nonsense, for neither increases prices	27	41	53
14. That condition of demand whereby a thing is wanted for several or many uses is: (1) joint; (2) inelastic; (3) derived; (4) composite	36	68	61

Even on these items where improvement is most marked the average percentage of correct responses at the end is only 73. On only two of the statements is the final percentage as great as 90. These facts point to real possibilities of further improvement—to be achieved in part, perhaps, through more explicit recognition of what essential points the course aims to make part of the students' thinking.

On the whole, Examination C shows results not greatly dif-

ferent from those of Examination A. Further comparison may well wait until we have considered the one remaining content test, as we shall then want to draw whatever conclusions we can from all four examinations.

Examination D (special reference to Spring Quarter).—The content test for the Spring Quarter is identical in form with that of the Winter Quarter. It consists of 80 multiple-response items, and the score is again the number of correct responses.

Changes in knowledge of Spring-Quarter content will first be considered in terms of the average scores of individuals and later with reference to test items. Table XV contains data parallel to those for the preceding tests.

TABLE XV

AVERAGE SCORES AND QUARTILES FOR EXAMINATION D AT THE BEGINNING AND END OF THE SPRING QUARTER—DATA FOR 170 STUDENTS

	Beginning of Quarter	End of Quarter	Improvement
Q_1	38.5	45.9	7.4
Median	42.4	50.0	7.6
Q_3	47.3	54.9	7.6
Q_3-Q_1	8.8	9.0	.....

P.E.'s (figured as for earlier tables) are between .4 and .5 for both medians and quartiles.

The distribution of individual improvement is given in Table XVI. It is not markedly different in nature from the corresponding distributions on the other examinations.

The correlation of the scores on Examination D at the beginning and at the end of the quarter is .60—about the same as for C. Correlations of scores with intelligence measurements and grades are given in Table XVII. These relationships are also similar to those of the preceding examination. One other significant relationship is likewise similar—the negative correlation between initial scores and improvement scores. The coefficent is —.43.

It is again of some interest to examine the individual items of the test in order to note the amount of change and the possible reasons for the improvement or lack of improvement on par-

ticular points. The average change is shown in the figures of Table XVIII. On two-thirds of all the items the increase in percentage correct was between 2 and 20.

Sixteen items showed practically no improvement—a result

TABLE XVI

PERCENTAGE DISTRIBUTION OF IMPROVEMENT SCORES OF INDIVIDUAL STUDENTS ON EXAMINATION D—SPRING QUARTER

Amount of Improvement	Per cent of Students
−6 to −3.1	3
−3 to .1	4
0 to 2.9	9
3 to 5.9	16
6 to 8.9	20
9 to 11.9	25
12 to 14.9	8
15 to 17.9	9
18 to 20.9	3
21 to 23.9	1
24 to 26.9	1
27 to 29.9	1

TABLE XVII

COEFFICIENTS SHOWING CORRELATIONS OF SCORES ON EXAMINATION D WITH INTELLIGENCE TEST SCORES AND GRADES IN THE ECONOMIC ORDER COURSE

	Otis Test	Spring Quarter	Year Grades
Examination D:			
Beginning of Spring Quarter	.39	.26	.38
End of Spring Quarter	.44	.35	.44
Improvement during the quarter	−.01	.09	.....

TABLE XVIII

AVERAGE PERCENTAGES OF RIGHT, WRONG, AND OMITTED RESPONSES ON ITEMS OF EXAMINATION D

	Beginning of Spring Quarter	End of Spring Quarter
Percentage right	53	62
Percentage wrong	44	37
Percentage omitted	3	1

due only in part to defects of the statements. The failure of students to improve on a number of the items appears to point to real elements of weakness in the course content or instruction of the third quarter. A number of other items on which far less improvement occurred than might reasonably have been expected reinforce the impression thus created.

The picture is not all dark, however, for marked improvement does occur on some of the parts of Examination D. The eleven items which showed greatest improvement are:

1. The least efficient part of the process of satisfying our wants is: (1) the manufacture of goods; (2) the choice of goods by the consumer; (3) the transportation of goods; (4) the merchandising of goods	49	75
2. The chief expenditures of the federal government are for: (1) the administrative, judicial, and legislative departments; (2) military purposes; (3) encouragement of agriculture and industry; (4) development of education and research	24	69
3. The regulations of mercantilism concerned chiefly: (1) the factory system; (2) the utilization of natural resources; (3) domestic trade; (4) foreign trade	46	75
4. Permanent federal regulation of railways began in: (1) 1868; (2) 1887; (3) 1903; (4) 1913	24	46
5. The most important difficulty of formulating social objectives is that: (1) there are certain inherent human characteristics which are largely unchangeable; (2) human nature is so plastic that objectives are sure to be those in which the people have been trained; (3) there is so much lack of interest in social problems on the part of most people; (4) there are conflicts of interests between individuals and groups and between groups	47	71
6. The common-law rule of *caveat emptor* ("Let the buyer beware") is least appropriate for dealings between: (1) farmers; (2) horse traders; (3) manufacturers and dealers in raw materials; (4) manufacturers and consumers	49	69
7. Individualism as a body of economic thought assumed that: (1) the consumer was helpless to protect himself against the producer; (2) the producer was sure to exploit the consumer; (3) the state should protect the consumer; (4) the the consumer was able to protect himself against exploitation	51	77
8. The idea of a "compensated dollar" is that: (1) only gold and silver money would remain in circulation; (2) the only		

medium of exchange would be fiat paper money; (3) the government would increase or decrease the amount of gold in the standard dollar from time to time; (4) the chief medium of exchange would be bank notes	40	67
9. The economic groups which have the most firmly rooted and effective codes of ethics are: (1) labor unions; (2) consumer groups; (3) the professions; (4) employer associations	66	86
10. The rates charged by public utilities would have to be changed most frequently if rates were based upon: (1) original cost; (2) reproduction cost; (3) original cost plus betterments; (4) original cost less depreciation	32	54
11. Individualism held that: (1) people have a right to use their property in any manner whatsoever; (2) people will never harm their fellow-men so long as they follow their own self-interest; (3) governments should encourage the development of desirable human types by eugenic regulations; (4) the greatest good will result from a minimum of governmental interference with people's activities	53	80

Even on most of these "best" items the showing is not anything to boast of—for example, the rise to only 69 per cent correct on "2" or 46 per cent on "4." The average percentage correct at the end is only 70. That considerable improvement has been made on these items is apparent, however, whatever may be the possibilities for greater change.

Changes in economic knowledge resulting from the course—summary.—On all four content examinations considerable improvement occurred between the first and last application of the test. The change is apparent both in individual improvement score and in records of correct responses to separate items of the examinations.

The average improvement in scores was in all cases about two or three times the semi-interquartile range of the original distribution of scores (about 15 to 20 times the P.E. of the average improvement). In general, less than 25 per cent of the students at the end of the year were below where the top 25 per cent had been at the outset. Or, if we take the median of the original scores as a point of reference, then at the end of the year only 4 per cent of Examination A scores were below that level,

6 per cent of scores on Examination B, 4 per cent on C, and 9 per cent on D (the last is for one quarter only).

Improvement is similarly manifested in the record of changes on the separate items of the tests. The percentage of correct responses on the several items of Examination A averaged 63 at the beginning of the course and 81 at the end; for Examination B it rose from 54 to 78; for C the averages are 50 and 66; for D, 53 and 62. In each test a few items showed remarkably great increase in the correct responses and other items reflected no increase at all (due in many instances to defects of the tests). But a majority of the individual items were answered correctly at the end of the year by at least 10 to 15 per cent more students than at the beginning.

These various records of improvement, both by individual students and by test items, may impress one as a very good, or a very poor, showing, depending upon one's expectations. It is about as easy to argue one way as the other, and in the absence of norms or standards each must form his own conclusion. But whether the improvement be adjudged great or small may be relatively unimportant; the chief significance of the material perhaps lies in the details of the particular changes and in the relationship of individual scores to other data concerning the students.

Students differ markedly in the amount of improvement they make during the year. On each examination there are a few who do worse at the end than at the beginning, a number who change very slightly in a favorable direction, and others who show rather great amounts of improvement. These differences appear to be little related to the students' intellectual ability or the general level of their work in the course as reflected in grades. Improvement scores correlate with intelligence test scores +.21, —.12, —.03, and —.01 for the four examinations. Correlations of improvement scores and grades are likewise close to zero. On all the tests except Examination A significant *negative* correlations are found between initial test score and improvement score. The coefficients run —.01, —.61, —.54, and —.43 for tests A, B, C, and D respectively. Students with meager economic

knowledge at the outset improve more on the average than those better informed. To some extent this may result from defects of the tests (especially the restricted range in Examination B) but this does not appear to be the entire explanation. It is certainly not impossible that the result arises from a condition of instruction and course lay out which fails to give the better students sufficient stimulation and opportunity. The question at least deserves more careful study. So also does the relationship mentioned in the earlier part of this paragraph, which indicates that good students and poor students, bright and dull, all made very nearly the same progress as measured by the tests.

[*To be continued*]

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HIGH FINANCE IN THE COTTON BELT

PATHOLOGY is as well recognized a department of medicine as therapeutics," Professor Ripley has declared in the preface to one of his works on railway transportation. With this thought in mind a few clinical notes are here offered on the so-called Southwestern Merger Case.[1] For there are symptoms in this case of maladies once pandemic, but now thought to be rare, or even extinct, in railway affairs. The allegations and arguments of the contending parties involve almost every phase of railway economics, from construction costs and operating efficiency to the purchase and sale of securities. The legal questions are quite as complex, and range from alleged impairment of the property rights of minority stockholders to the charge of violation of the Clayton and Interstate Commerce acts. The case therefore deserves the serious attention of all students of contemporary railway problems. It cannot be summarized completely within the limits of this paper, and we shall therefore confine our attention to those issues which we believe are of major importance.

A brief description of the chief railway properties affected by the merger should be given first. The Kansas City Southern —which will be referred to as the Kansas City Company—may be regarded as the chief protagonist because it was waging a defensive battle to justify the several steps it had taken to absorb the other properties. The main line of this railroad extends from Kansas City, Missouri, in the north, by way of Shreveport, Louisiana, to its southern terminus in Port Arthur, Texas, a gulf port. The branch line mileage is relatively small, and the volume of traffic on the main line has reached a point where it is highly profitable. The freight density in 1925 was nearly 2,000,000; and net railway operating income per mile of road operated was

[1] Cf. Finance Docket, Nos. 5679 and 5680, I.C.C.

$5,019. The road was earning approximately 11 per cent per annum on its investment. More than that, its future is very bright because of the larger industrial development that is undoubtedly due to occur in the region of its southern terminus, where it enjoys a virtual monopoly, although it has a nominal competitor in the Southern Pacific.

The Missouri-Kansas-Texas, which the Kansas City Company sought to absorb or control, has northern termini in both Kansas City and St. Louis, Missouri, and it extends with considerable ramification down through Oklahoma into Fort Worth, Texas, and on to Houston and Galveston, Texas, both of which are gulf ports. For the sake of convenience this railroad will be designated the Missouri Company.

The other road involved in the attempted merger was the St. Louis-Southwestern, whose trade name, the Cotton Belt, suggested the title to this paper, and indicates, after a fashion, the route traversed by its lines, viz., from St. Louis, through Missouri and Arkansas, to Texarkana, Texas, and on to Fort Worth and Waco, Texas. It is important to add that the St. Louis Company (St. Louis–Southwestern) connects with subsidiaries of the Southern Pacific which afford it an outlet to southern Texas and the sea.

From the situation of the three roads it will be seen that the Missouri Company is in a position to compete with the Kansas City Company at Kansas City for traffic to and from the gulf coast; while the St. Louis Company is able to compete with the Missouri Company at St. Louis for business in north Texas over its own rails and, by virtue of an arrangement with the Southern Pacific, for business in south Texas as well. It was brought out in the hearing before the Interstate Commerce Commission that prior to the merger this three-cornered competition was actually very keen, and was by no means to be thought of as merely potential.[2]

[2] Of course this was denied by the proponents of the merger. It is impossible to detail the evidence supporting our view within the limits of this paper. Our conclusion is based upon testimony appearing in the following pages of the official record: 940–42, 949–50, 1020, 1221–22, 1325–27, 1329–30, 1376, 1424, 1429–30, 2153–55.

The leading opponent of the merger was the Waco, Beaumont, Trinity, and Sabine, a short-line railroad in Texas, which claimed that its very existence was imperiled by the plan, and appeared as the principal intervener in the application of the Kansas City Company for approval of its dealings. Among other interveners who played an important part in the hearing was a representative of some minority stockholders in the St. Louis Company who felt that the plan was inimical to the best interests of their company.

The bald facts of the chief financial transactions are not difficult to understand once they have been separated from the maze of evidence contained in the record of testimony. The Kansas City Company began by accumulating in the course of a year's time some 350,000 shares of the common stock of the Missouri Company. This stock, which was non-dividend paying, was purchased from Kuhn, Loeb & Company and other brokerage houses at an average price of $32.798 per share, or a total price of $11,479,583.70. The transaction was consummated in October, 1925. In order to finance it the Kansas City Company borrowed $5,000,000 from the Bankers Trust Company of New York, paying interest at 5½ per cent per annum on the loan. It also borrowed $1,830,000 from Ladenburg, Thalmann & Company, on brokerage account, in just the same way that any speculator might borrow, i.e., by depositing or pawning the stock purchased with the broker. The balance of the $11,500,000 was apparently paid in cash from surplus funds of the Kansas City Company.

The Kansas City Company next proceeded to acquire what is known in technical parlance as a "working control" of the St. Louis Company. It accomplished this by buying 20,000 shares of common stock and 135,000 shares of preferred stock in that company. Practically all of these shares were bought from the Chicago, Rock Island & Pacific at prices of $60 and $92 respectively for the common and preferred. This was done in October and November, 1925. The holdings of the Kansas City Company in the St. Louis Company thus amounted to 155,000 shares, or 42.7 per cent of the total voting power, inasmuch as

there were 362,497½ votes vested in both preferred and common stock. The price paid to the Rock Island for the preferred was about $12 more than the highest market price at any time in the six months preceding or subsequent to the sale. Yet the Rock Island was known to be rather anxious to part with the stock because its retention thereof had been criticized severely in the Burnside report to the Interstate Commerce Commission.[3] Of the total price of some $13,500,000, about $6,000,000 or more was paid in cash, leaving an indebtedness in excess of $7,000,000. The burden of this indebtedness was "distributed" (in the language of finance) to the Missouri Company as will be explained presently.

Having acquired a working control of the St. Louis Company, the Kansas City Company proceeded to utilize the former as a means to tighten its hold on the Missouri Company. It caused the St. Louis Company to buy 100,000 shares of the Missouri Company's common stock at an average price of about $45 per share. This transaction was approved by the board of directors of the purchasing company on February 26, 1926. In order to pay for the stock the St. Louis Company sold $2,000,000 worth of government securities and borrowed the rest from brokers at 5½ per cent per annum. The purchase was carried in what accountants call a "suspense account." That is to say, it was subject to a covenant of the Kansas City Company to *offer* to buy the stock at cost within six months after the Commission rendered its decision on the merger. Whether the St. Louis Company would elect to accept the offer depended of course upon its controlling interest, that is to say upon the Kansas City Company itself. Here we have one of those paradoxical intricacies which the financier rejoices to invent.

Thus it came to pass that the Kansas City Company, by controlling 100,000 shares in the Missouri Company through its control of the St. Louis Company, and 350,000 shares by direct ownership (acquired in the manner before explained), was able to vote 450,000 shares in the Missouri Company at the stockholders' meeting held on April 9, 1926. Although the total vot-

[3] Cf. Finance Docket, No. 4800, I.C.C.

ing power in the company was over a million shares, only 82 per cent were voted. This gave the Kansas City Company about 60 per cent of the total voted shares; and so, in the satirical words of one of the interveners, "The citadel of the Missouri Company with all its resources was captured, and its unhappy garrison was compelled to surrender unconditionally to the Kansas City Company." However, cumulative voting is permitted by the laws of Missouri, and by agreement the Kansas City Company consented to have the "previous control" represented on the board of directors by a harmless minority.

The final major transaction in the program up to the time of the hearing was to unload the entire holdings of the Kansas City Company in the St. Louis Company upon the Missouri Company at "cost." This was achieved in July, 1926, when the board of directors of the Missouri Company passed a resolution authorizing the purchase of 155,000 shares in the St. Louis Company from the Kansas City Company. According to the terms of the contract the Missouri Company was to pay $7,000,000 at once to the Kansas City Company. The balance, with interest at 5 per cent per annum, was to be paid within thirty days after the Commission's approval of control of the St. Louis Company by the Missouri Company. The shares were to be held in trust pending the completion of the deal. If the Commission should fail to approve the plan, the Kansas City Company agreed to repay the amount advanced by the Missouri Company with interest. In addition, there was a curious clause to the effect that upon failure of the Missouri Company to pay the balance of the purchase price within ninety days after its due date, the initial payment by the Missouri Company should be forfeited to the Kansas City Company as "liquidated damages."

We will not attempt to pass judgment on the legal issues growing out of this jumble of financial hocus-pocus. Some of them have apparently been settled by the decision handed down by the Interstate Commerce Commission in this case. Others must be left to the courts to decide, if they are ever decided. We will be content with a statement of some of the leading questions raised by those who opposed the merger.

In the first place it was alleged that the acquisition of a controlling interest by the Kansas City Company in the other two roads violated Section 7 of the Clayton Antitrust Act, which expressly forbids any corporation engaged in commerce to acquire, directly or indirectly, any part of the stock of another corporation also engaged in commerce where the effect of such acquisition may be to lessen competition or restrain commerce; or to acquire a controlling interest in any two other competing companies where the effect would be to restrain their competition substantially. Secondly, it was charged that the Missouri Company violated Section 10 of the Clayton Act, which declares that no common carrier shall have dealings in securities to the amount of more than $50,000 in any one year with another corporation when "the said common carrier shall have upon its board of directors or as its president . . . . any person who is at the same time a director . . . . in such other corporation," unless such purchases shall be made by competitive bidding under regulations to be prescribed by the Interstate Commerce Commission. This charge was made because Mr. L. F. Loree, the chairman of the directorate of the Kansas City Company, was also chairman of the directorate of the Missouri Company when the former sold its stock in the St. Louis Company to the latter.[4]

It is true that Section 5 of the Interstate Commerce Act of 1920 modifies the Clayton Act in so far as it applies to common carriers, but the interveners argued that the later legislation does not purport to give the carriers carte blanche in their financial operations. In the opinion of the opponents of the merger, Section 5 contemplates that the carriers shall *first* secure the permission of the Interstate Commerce Commission before doing those things prohibited by the Clayton Act, because the section provides that the railroads shall be relieved from the prohibitions only in so far as may be necessary to enable them to do anything authorized or required by order of the Interstate Com-

[4] The Interstate Commerce Commission recently has held these charges to be grounds for formal complaint by it under the Clayton Act. The Commission has brought action against the Kansas City Southern, citing it to show cause why it is not violating the law.

merce Commission. It was urged that in paragraph (2) of Section 5 the intention of Congress was to require the carriers to present their plans to the Commission for its approval *before* they may legally ignore the Clayton Act. This paragraph reads in part as follows:

> Whenever the Commission is of opinion, after hearing, upon application of any carrier . . . . that the acquisition, to the extent indicated by the Commission, by one of such carriers of the control of any other . . . . carriers . . . . will be in the public interest, the Commission shall have authority by order to approve and authorize such acquisition under such rules and regulations and for such consideration and on such terms as shall be found by the Commission to be just and reasonable.

The Kansas City Company did not take the trouble to get the Commission to decide for it what should be the consideration, and what the terms, before it bought the stock in the other corporations. Instead, it bought the stock first, and then asked the Commission to approve. The Commission was presented with a *fait accompli,* and asked to absolve any transgressions of the law and to ratify the transactions. As one of the lawyers opposing the merger somewhat wittily put it, the Commission was asked to say to the Kansas City Company, "Neither do we condemn thee; go and sin some more." This the Commission has refused to do, and the Kansas City Company must make some other arrangement. It will be interesting to see just how the managers of the merger will finally work the thing out. It is much easier to scramble properties together than it is to unscramble them.

It must be said in justice to the proponents of the merger that the law as it now reads does not seem to make much allowance for the exigencies of practical finance. It is difficult to see just how the promoters of a merger could lay their cards on the table in a public hearing before buying the shares without having to pay exorbitant prices for them when it became known that the Commission had authorized their acquisition of the stock. Whatever its intention may have been, Congress has left the consolidation problem in a muddle and more definite legislation to meet the issue squarely is urgently needed.

Another important legal issue raised by the opponents of

the merger was the question of whether the board of directors of the Kansas City Company exceeded their authority in undertaking a major transaction involving the acquisition of a whole new enterprise and the assumption of large indebtedness without securing the approval of the stockholders. The same question applied to the venture of the directorate of the Missouri Company in acquiring control of the St. Louis Company. The attitude assumed by the promoters of the merger with regard to this matter is not a salutary one, in the opinion of the writer. The officers of public service corporations should seek to do more than merely to stay within their legal rights and powers, and they should assume a larger responsibility to their stockholders than the law requires. This the promoters did not deem practicable. Consider the testimony of one of the officials of the Missouri Company:

Q. What reason have you to assign for not permitting the stockholders to determine and say whether or not they want this plan carried out?

A. Because this transaction was within the power of the board of directors which they elected to conduct the business of the company.

Q. Well, now, is it in the power of the board of directors?

A. I am so advised.

Q. Assuming that advice is correct, ... do you not think those people who have their money invested in the property ought reasonably and properly . . . . to have a chance to say whether or not they want to embark on these great ventures?

A. I do not. I think that is entirely impracticable in the conduct of such matters.[5]

Stockholders were not even informed of the merger transactions in the notices of annual meetings, it was brought out in the examination of Mr. Daniel Upthegrove, president of the St. Louis Company.[6]

Closely allied with the question of *ultra vires* acts of the directors was the alleged disregard of the property rights of minority stockholders in the case of the Missouri Company and the St. Louis Company. Two alleged examples of such disregard were the unloading of the high priced shares in the St. Louis

[5] Record of testimony, p. 164.

[6] Cf. record of testimony, p. 1319 ff.

Company upon the Missouri Company, and the execution of a traffic agreement by the St. Louis Company with the Southern Pacific.

The first of these has already been described in detail. In connection therewith, however, it is worth while to observe how the legal philosophy of corporate personality was ingeniously developed by one of the managers of the merger into a theory of dual personality in human beings. This weighty contribution to metaphysical psychology appears in the following passage:[7]

Q. If I remember correctly . . . . you stated that you conducted the negotiations yourself, did you not?

A. I did.

Q. Did you attempt to dissociate your identity as chairman of the Kansas City Southern from your identity as chairman of the Missouri-Kansas-Texas?

A. Absolutely.

Q. Do you think that is practical. . . . .?

A. I do not think it is any more impractical than for a father to bring up a family of children.

Q. Well, but in this particular case the Kansas City Southern, and not yourself, is the papa of the Katy, is it not?

A. It is not. The Kansas City Southern owns some of the stock of the Katy, but that is all. It is a shareholder like everybody else.[7]

From this illuminating bit of colloquy one can see very well why it is that the theory of corporate individuality creates a formidable obstruction in the way of effective regulation of corporations. Such a theory is a fiction that may be convenient for traditional law, but it does not have much in the way of economic reality to commend it. Universal experience shows that out of a single falsehood any number of falsehoods may be compounded by inexorable logic. As long as the law predicates a false definition of the essential nature of a corporation the courts will find it embarrassing not to recognize other fictions concocted by astute lawyers to permit the abuse of corporate power. And just so long it will be a task of Sisyphus to keep the conduct of corporate affairs in the narrow path of honesty and justice.

The traffic agreement between the St. Louis Company and the Southern Pacific requires explanation. It is indeed a curious

[7] Record of testimony, p. 148.

document, and a very interesting one, because its history shows the strength of railway competition and rivalry for traffic at the present time. The Southern Pacific did not view the activities of the Kansas City Company with equanimity by any means, because it has enjoyed for years a "unilateral preferential" traffic arrangement with the St. Louis Company,[8] and it feared this arrangement might be disturbed. The St. Louis Company could have access to southern Texas over the lines of the Missouri Company, if their rivalry were ended by joint control, and then the St. Louis Company would no longer need to interchange freight with the Southern Pacific. Therefore the Southern Pacific bluntly threatened to intervene before the Interstate Commerce Commission in the merger proceedings if it were not given assurance that there would be no change in its relation to the St. Louis Company under the new régime.

The Kansas City Company consented to "buy off" the Southern Pacific by causing the St. Louis Company to make, and the Missouri Company to acquiesce in, a formal contract (to become binding when approved as a part of the merger plans) indefinitely guaranteeing the continuation of the existing traffic arrangement between the Southern Pacific and the St. Louis Company. It was alleged by interveners that the execution of this contract deprived the St. Louis Company of all value to the Missouri Company as a permanent investment for the purposes of control, and that the latter company was forced to make a high-priced purchase with ordinary dividends as the only possible reward. It was claimed that this infringed upon the rights of the minority interest in the Missouri Company. Of course it would not matter to the majority interest—the Kansas City Company—which ruled the whole situation and could manipulate both the other companies to its greatest *net* advantage.

Turning our attention again to the more purely financial aspects of the attempted merger, we are at once impressed by the degree to which responsibility and control were dissociated

[8] The St. Louis Company gave preference to the Southern Pacific in routing through shipments, whereas the Southern Pacific only agreed not to discriminate against the St. Louis Company in its routing.

by the plan. The concentration of control in the hands of the Kansas City Company was achieved on a surprisingly slender margin, one wholly insufficient to guarantee responsibility. The capital assets of the Missouri Company aggregated approximately $300,000,000, and the capital assets of the St. Louis Company amounted to about $150,000,000, making a total value of $450,000,000 which the Kansas City Company was controlling on its initial investment of $11,500,000 in the Missouri Company. This amounts to less than 2.7 per cent of the value of the controlled properties. When it is recalled that more than half of the investment of the Kansas City Company came from funds borrowed casually from banks and brokers, it becomes clear that the actual cash investment of the Kansas City Company was only about 1 per cent of the aggregate properties dominated therewith! This is a twentieth-century miracle of multiplication which rivals that of the five loaves and two small fishes.

The proponents of the merger declared that they were prompted by a desire to achieve economy in transportation costs through unification, and they alleged some seventeen different ways in which savings could be effected. The interveners vigorously denied the possibility of any substantial saving. The technical questions raised in this controversy are too intricate to be analyzed in this paper. Suffice it to say that in the mind of the writer, the operating expert employed by the interveners effectually demolished most of the applicants' contentions. At all events it was demonstrated that the possibilities of economy had not been probed more than superficially by the managers of the merger. It was admitted by Mr. Loree, in answer to a question put by Director Mahaffie, that no engineering or other study of the possibilities of combining the Kansas City Company and the Missouri Company was made prior to the purchase of control in the latter by the former.[9] Something of the nature of the real motives prompting the merger was probably revealed by one of the officials of the Kansas City Company in one of his more expansive moments when he unburdened himself in the following manner: "The point I would like to make clear to you is a good

[9] Record of testimony, p. 346.

many people are governed by the philosophy of David Harum, 'Do to the other fellow what you think he is going to do to you, but do it first.' . . . . I thought it was to the interest of the stockholders of the Kansas City Southern to look around and . . . . put up a system to protect itself."[10]

Whatever their motives may have been, it should be clear from this brief description of their *modus operandi* that the managers of the merger were not primarily interested in the public welfare. Moreover, there is reason to believe that their code of ethics is not altogether different from that of the promoters of other railway consolidations. If this be true, the public interest requires that all plans for the creation of super-systems be scrutinized very carefully before they are approved by the authorities. In general, the slower the progress toward consolidation, the better.

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[10] *Idem*, p. 136.

COUNTRY BANKING PRACTICES IN NORTHERN TEXAS

III. INTEREST CHARGES AND OTHER SOURCES OF REVENUE

The northern Texas country banks, like all other banks, are vitally interested in their sources of income. The principal source of income is, of course, the interest charged on loans to customers; for this reason the rates of interest of these banks, together with the considerations determining these rates, are given primary consideration in this paper. There are discussed, in addition, the revenues resulting from outside loans, i.e., loans made to other banks and corporations not in this territory, and the fees charged for rendering certain services. Mention is also made of the policies relating to the costs of money borrowed from their customers through the practice of paying interest on deposits.

A. INTEREST RATES AND THE FACTORS DETERMINING THEM

Interest, as defined by the Civil Revised Statutes of Texas, "is the compensation allowed by law or fixed by the parties to a contract for the use or forbearance or detention of money,"[1] while "conventional interest" as opposed to "legal interest" "is that interest which is agreed upon and fixed by the parties to a contract, not to exceed 10 per centum per annum." Interest for the purpose of this discussion will be used synonymously with conventional interest.

The legal limit of 10 per cent to interest rates is further stressed in the provision that "the parties to any written contract may agree to, and stipulate for, any rate of interest not exceeding 10 per centum per annum on the amount of the contract; and all written contracts whatsoever which may provide for a greater rate of interest shall be void and of no effect for the amount of the interest. . . . ."[2] Since the rate of interest of national banks

[1] Civil Revised Statutes of Texas (1925), Art. 5069. [2] *Ibid.*

is likewise regulated by state law,[3] this limit is effective upon all banks. And as there is no law to the contrary, all banks may deduct the amount of interest charged in advance.[4]

The interest rates among the banks here studied vary from time to time and from bank to bank. One state bank, in a thickly settled agricultural section and located between Fort Worth and Dallas, has a variable rate, ranging from 6 per cent to 10 per cent; a national bank in a town of about 7,500 people which must meet the competition of three other banks has a similarly fluctuating rate of from 7 per cent to 10 per cent. Sixteen other banks carry a variable rate, extending from 8 per cent to 10 per cent; while one state bank, in a hamlet of less than 100 people, shows a rate ranging from 10 per cent to 20 per cent. But by far the most common practice among all the banks—state, national, and private—is to maintain one basic rate which in many cases becomes semi-fixed. There are cases in which, if the risk is very small or the loan very desirable, some banks will permit a lower charge to be made; as there are cases in which a loan involving great risk carries a higher charge, provided the legal maximum is not exceeded. Eighty-three banks have such a base rate from which variations are sometimes made. In this group of eighty-three are forty-two national banks, thirty-one state banks, and ten private ones. Four of them have rates of 8 per cent; one of 9 per cent; and the other seventy-eight of 10 per cent. Twenty-three fail to indicate whether this rate ever varies; of the remaining sixty banks, thirty-four of them cite factors which influence the rate to such an extent as to cause variations from it, while the other twenty-six have a constant rate, or at least one that never varies in actual practice. In other words, of the seventy-eight banks which explain the factors governing their interest rates, 33 per cent of them are found to have a constant charge. It is inter-

[3] Any national banking association "may take, receive, reserve and charge on any loan or discount made, or upon any note, bill of exchange, or other evidence of debt, interest at the rate allowed by the laws of the state . . . . where the bank is located . . . . and no more. . . . ."

[4] Where there is no state law in conflict, laws governing national banks specifically state that "interest may be taken in advance" (National Bank Act, Sec. 5197).

esting to note that one of the oldest and strongest private banks of this district remarks that "our rate for the past twenty years has been 8 per cent, regardless of conditions." The composite or average rate of private banks,[5] as of the time of this study (the spring of 1926), appears to be under that charged by either state or national banks.

Table I shows the rates of each class of banks, the extent of variability of rates, and the number of banks maintaining each rate at the time of this study.

TABLE I

INTEREST RATES OF NORTHERN TEXAS COUNTRY BANKS

RATES OF INTEREST (PERCENTAGE)	NUMBER OF NATIONAL BANKS OF CLASS INDICATED			NUMBER OF STATE BANKS OF CLASS INDICATED			NUMBER OF PRIVATE BANKS OF CLASS INDICATED			TOTAL
	V	NV	NI	V	NV	NI	V	NV	NI	
6–10	....	....	....	1	....	....	....	....	....	1
7–10	1	....	....	....	....	....	....	....	....	1
8–10	11	....	....	5	....	....	1	....	....	17
8	2	....	....	....	....	....	....	1	1	4
9	1	....	....	....	....	....	....	....	....	1
10	14	15	9	13	9	10	4	1	3	78
Total	29	15	9	19	9	10	5	2	4	102

V, variable rates; NV, non-variable rates; NI, variability not indicated.
Number of banks having variable rates, 53.
Number of banks having constant rates, 26.
Number of banks not indicating variability, 23.

These rates have very little relationship to the Federal Reserve rediscount rate. Five national banks state that their rates are influenced by the rediscount rate, while a sixth uses the term "somewhat" to express the extent to which its rate is affected by the Dallas Reserve Bank rate. On the other hand, eight state banks, only one of which is a member of the Federal Reserve System, remark that the interest charged varies with the Reserve rediscount rate, while there are only two private banks in which the rediscount rate is alleged to be an influencing factor. Yet of

[5] Exclusive of those banks which have a scale of variable rates at a particular time for different kinds of risks, private banks have an average rate of 9.6 per cent; national banks, 9.88 per cent; and state banks, 10 per cent.

these, all but two mention considerations which make extremely doubtful any direct relation between the two sets of rates. Rather, the Reserve rate tends to serve as an indicator of the presence of these other conditions, i.e., it substantiates or refutes the opinions of the individual banker and serves to inform him of approaching changes in financial circles, it being still necessary to reckon with local conditions before determining the interest rate. To illustrate, one banker whose rate "varies with the Reserve rediscount rate" says that the rate is also affected by the "amount of surplus funds available for lending." The rediscount rate, it would seem, tends to inform him when money is plentiful and when the local rate may be adjusted accordingly. As has been previously shown, factors influencing the banks of one locality may differ so greatly from those affecting the entire group of banks in the Eleventh Reserve District that local conditions must inevitably play a leading part in determining the local or country-bank rate. Certainly, with a spread of 6 per cent between the Reserve rate and the country-bank rate prevailing in the spring of 1926, and with a spread of only 3 per cent in the early part of 1921,[6] there can be no direct relationship between the two rates. And it is highly improbable that local conditions would ever permit of any direct adjustment of the rates of these banks to the Reserve rate, other than merely to follow the general trend of the latter.

Be that as it may, the factors that actually go to determine the rate of interest of the country banks in this section are many and varied. To facilitate discussion they may be grouped under five heads: (1) the risks involved; (2) the costs of operation; (3) general economic conditions; (4) the value of the customer's business; and (5) local custom.

As was noted earlier, chattel mortgages on unproduced agricultural crops constitute security for a large part of the assets of these banks. Yet in the event of a crop failure, the crop which was mortgaged as security never materializes; or in the case of

[6] *Federal Reserve Bulletin, 1921.* The rates on all forms of paper eligible for rediscount, however secured, were 7 per cent from February to April, 1921, in the Eleventh Reserve District.

live stock and farm implements as security, little value can be realized from them in case of foreclosure; for the very fact that general conditions necessitate such action tends to curtail the purchasing power of potential buyers to whom the bank might sell. If agriculture in a territory that depends upon one, or at the most a limited number, of money crops may be considered a speculative venture (since there may be utter failure in the case of adverse weather conditions), the banks of this region may be said to be confronted with continual demands to finance speculative production. And holding this speculation to a minimum, i.e., reducing the possibilities of loss and lending to farmers who are considered good risks, is the task of the individual banker. Hence the merits of each loan, the responsibility of the borrower, weather and price conditions in the case of farm loans, and the type of security are major considerations in determining the amount of risk involved. So great are the risks on rural loans unless secured by real estate that the maximum legal rate is ordinarily charged. One banker says that "the custom in this country is to charge 10 per cent, where a bank loans to farmers in small notes to make crops and is compelled to carry notes until crops are gathered, regardless of when the note matures." A national bank—one with a variable rate—goes farther in stating that "the farmer rate is high because we never know whether we can collect or not." A third, serving a "territory devoted to agriculture and stock-raising, and adjacent to a considerable territory producing oil," explains that "since local loans are more hazardous and non-liquid, we impose the legal limit of 10 per cent." On the other hand, rates of 6 per cent and 8 per cent on large, long-time loans secured by real estate are set by one bank, and numerous other banks indicate that lower rates obtain on real estate offered as security.

The length, amount, date or season of maturity, the form of instrument by which the loan is made, the purpose to which the funds are devoted—all are important in finding the rate to be charged. Particularly is the size of the loan to be considered, for "all farm loans are in small amounts," explains one banker, with the result that 10 per cent is almost always charged. Not infre-

quently a higher rate than the legal maximum is charged for loans of this nature. In the case of one bank with a rate of 12–16 per cent on short loans, the explanation is made that $12.50 to $14.00 per $100 loan is frequently charged on loans made after the first of the year, and running until October. In other instances where small loans are made, not necessarily for agricultural purposes, higher rates than 10 per cent are charged, for, as one banker[7] explains, "We have small loans of from $10 to $50 made for a period of 30, 60, and 90 days. The interest at the rate of 10 per cent on $10 for 90 days would be $0.25, an amount that would hardly justify the expense and labor of making the loan. Our fee in this case would be $0.50; on a loan of $25 for 30 or 60 days we would charge $0.50; and on $50 for 30 days, $0.50. This might be called a service fee instead of an interest charge."

In addition to the risk factor, and probably only second to risks in justifying these high rates, are the high operating costs of the banks. The costs of operation continue during the poor years as well as during the prosperous ones, and must be covered by the profits of a succeeding profitable period. Furthermore, with the development of the community there is a progressive increase in overhead expenses of the country bank which serves the area. One man estimates that a public stenographer would earn $150 per month for performing the services which he extends without cost to his patrons. Another remarks that he charges "the legal limit at all times, and this is necessary if we are to continue operations, for the reason that the services of a bank increase overhead expenses yearly until the average country bank barely pays fair dividends."

In the third place, economic conditions play an important part in justifying the rate, particularly the rate that is changed from time to time. As has been seen, two different forces operate continuously in this section: upon the one hand are general marketing conditions and forces having economic significance the country over; upon the other hand are the local conditions of production and finance. When local conditions are favorable and

[7] The same banker to whom reference was previously made as one charging a rate as high as 20 per cent at times.

tend to make money plentiful and interest low, general financial conditions elsewhere may cause high interest; or, with cheap money elsewhere, money may still be high in this area because of adverse local conditions. By far the majority of banks which do not follow a set rate year after year are governed by local economic conditions which are variously characterized as "demand and supply," "amount of surplus funds available," "surplus to be employed," "local conditions," "accumulation of funds." Some bankers, however, refer to "the money market," "widespread economic conditions," and "abundance or scarcity of funds generally," and others mention factors paralleling the general trend of the business cycle. A few cite "what we pay for money" as a determining factor.[8]

Only two banks attribute any influence on rates directly to competition, and one of these is in a town having, until recently, four banks. There seems to be little relationship among the amount of competition, the supply and demand of funds, and the number of banks in a town. A national bank in one of the largest towns states that the demand for funds usually taxes the supply; while small communities with but a single bank receive the benefit of lower rates at times when an abundance of funds leaves a surplus to be disposed of.

Again, individual influence and responsibility is of some weight in fixing the interest rate, but apparently of less weight than any other single set of factors. Only six banks, or about 8 per cent of those reporting, indicate that "the value of the customer's business to the bank," or "the size of the account carried with the bank when not a borrower" receives any more favorable consideration than other matters. The writer has been unable to find a single bank that requires a deposit to be maintained against borrowed funds. Only slight reference is made to financial statements, a single bank mentioning any use of them. It seems that the general financial repute in which a man is held is the chief influence affecting the rate in individual cases.

Finally, custom has become a large factor in rate-making.

[8] The cost of money borrowed from customers is discussed in the following pages.

One rate tends to become the standard figure, from which deviations may be made if circumstances warrant, although some bankers assert that no changes have been made for a number of years. Typically the rate set by custom is 10 per cent. A few banks give definite business reasons for having a fixed rate, but the most of them charge "the same rate, year in and year out," because it has become customary. Others charge this rate because "it is the limit under Texas law." While this rate is no doubt justifiable in many cases if the banks are to continue to operate and to serve the farming and live-stock interests of their respective communities, yet this custom is evidently an outgrowth of a banking practice which was at one time little influenced by a centralized banking system, and only slightly affected by the general financial and economic conditions of the country as a whole. Certainly as this territory becomes more highly developed industrially, and as competitive banks are placed in stronger positions to accommodate the industrial needs, rates must follow some more or less defined business trend, subject, of course, to local fluctuations.

It will be noticed from the foregoing that the cost of money loaned, i.e., money borrowed from customers or from other banks, is a minor factor in determining the rate charged the borrower. This is logically the result of the fact that the rate will have reached the maximum legal limit before any large amount of borrowing or rediscounting has become necessary, so that the cost of borrowed money can influence but little the rate paid to the bank. Yet most of the banks of this area borrow money from their customers, and often from local and municipal governments, by the payment of interest on deposits. These funds or deposits drawing interest may be classified into (1) individual deposits subject to withdrawal on demand; (2) individual deposits subject to withdrawal after thirty days' notice; and (3) deposits of public funds. A comparatively small number of banks pay interest on demand deposits which are maintained for certain periods in required amounts. Of the 108 reporting banks, only fifteen pay interest on demand deposits, while eighty-six pay interest on time deposits, and forty-nine pay interest on pub-

lic funds. Public funds are received on deposit by virtue of offering the highest bid for them; as a result, the number of banks holding public deposits at a particular time must necessarily be limited. Then, too, the small bank in the unincorporated town, or in the common-school district which has no jurisdiction over the deposits of its own funds, has little opportunity to bid for local public money. Its only opportunity to receive such deposits is to bid against the stronger banks of its county for county funds; a practice which is not commonly followed, less than 40 per cent of the banks in towns of less than 800 inhabitants holding public funds.

The prevailing rate paid on each type of deposit is 4 per cent, though quite a spread, of from 1 per cent to 5½ per cent, exists in the rate paid on public funds, caused, of course, by competitive bidding.[9]

Table II serves to indicate the tendencies of rates on each type of deposits, with the number of banks paying each rate.

Several banks issue certificates of deposit which have stipulated rates of interest on the face of them; these may be in essence demand deposits, depending upon the particular type of certificates. Several banks which pay interest on demand deposits attempt to discourage it, reluctantly agreeing to pay interest as a special favor to valued customers, or on accounts which are of the nature of time deposits. When it is recalled that a reserve of 20 per cent is required on demand deposits in the case of state banks, it will be readily understood why only six state banks pay interest on this type of deposits. Since only $80 out of every $100 of demand deposits are available for use by the local bank, a rate of 4 per cent becomes actually a rate of 5 per cent. One of

[9] Banks serving as depositories for county funds are determined by the commissioners' court of each county, which "is authorized and required at the February term thereof next following each general election to receive proposals from any banking corporation . . . . in such county that may desire to be selected as the depository of such county" (Rev. Civ. Stat. of Texas [1925], Art. 2544): and "to publicly open such bids and to select as the depository the banking corporation . . . . offering to pay the largest rate per annum for said funds" (Art. 2546). "The interest upon such county funds shall be computed on daily balances to the credit of such county treasurer monthly" (*ibid.*)

Depositories for city and school funds are similarly selected in July of each year by the city council of the city placing its funds on deposit (cf. Art. 2559).

the oldest and strongest state banks of this section seems to have a very practical solution to the difficulty which confronts the banker when asked either for interest on this type of deposits or for the issuance of certificates of deposit. A letter from this bank states that "we have a few certificates of deposit, and upon these we pay 4 per cent; however, we find this business very unprofitable and only take small accounts from some of our very best customers who carry a nice balance in open accounts. For the

TABLE II

NUMBER OF BANKS PAYING INTEREST ON DEPOSITS

Rate of Interest Paid	On Individual Demand Deposits*	On Individual Time Deposits	On Public Funds
2% or under	.....	.....	13
Between 2% and 3%	1	1	1
3%	5	6	8
Between 3% and 4%	.....	4	6
4%	9	73	19
Between 4% and 5%	.....	.....	1
5%	.....	2	1
Total	15	86	49

* The practice of paying interest on demand deposits is actually followed only to a minor extent. Further inquiry made to those banks reporting that they pay interest on demand deposits reveals that the cases where interest is thus paid are quite few. The chief significance of interest paid on this class of deposits seems to be that it facilitates holding a small number of desirable accounts which are maintained at a fairly constant amount and which might be taken elsewhere were interest not paid. As a means of obtaining funds for the use of the bank, it constitutes no well-defined policy.

benefit of our customers who require interest on their money we give United States bonds or purchase other good securities for them; we find this much more profitable and satisfactory than issuing them certificates of deposit and the bank paying them interest on their money." Probably numerous others follow a similar policy.

In connection with public funds on deposit with state banks, it should be noted that such banks are not subject to payment on these funds in determining assessments under the Guaranty Fund System as based on average daily deposits, for public funds are secured by special bond required by law,[10] and are, for this reason, especially exempted from assessment.[11]

[10] Civil Revised Statutes of Texas (1925), Art. 2547.

[11] State Banking Laws of Texas (1923), Sec. 109.

The amount of time deposits varies considerably from bank to bank, two banks showing as low a figure as ¼ of 1 per cent of total deposits, while five banks indicate as high an amount as 25 per cent of total deposits. One of these five, a small state bank, explains that "the percentage of time deposits is a great deal larger during the spring of the year than at any other, as most all the time deposits will remain about the same the year round and from year to year, while our individual deposits are at their lowest at this time of year." Of the 72 banks having time deposits at this season, 27 are state banks, in which time deposits average 7.5 per cent of the total deposits; 7 are private banks having 7.4 per cent of total deposits comprised of time deposits; and 38 are national banks whose time deposits average 11.3 per cent of total deposits.

B. OTHER SOURCES OF PROFIT

After the banks of this area have met all worthy and justifiable local demands for loans, the surplus assets are distributed in ways which will permit the greatest earning power and at the same time provide liquid resources. These funds may be divided into five groups: first, funds kept on hand as till money; second, funds invested in bonds and securities; third, funds invested in short-time commercial paper; fourth, loans on the New York call-loan market; and fifth, funds left on deposit with correspondent banks, usually in reserve cities. Since till money earns no returns, and since classes 2, 3, and 4 have been previously discussed,[12] money on deposit with correspondents remains the chief earning asset yet to be discussed.

Since till-money requirements must be met before money can be loaned by country banks to their city correspondents, it is well to ascertain what amount is ordinarily kept on hand to meet withdrawals by depositors. The amount, of course, varies from season to season, being greatest during the fall when crops are being gathered and marketed, and smallest during the spring

[12] See the preceding paper. The discussion of funds left on deposit with correspondents has been reserved to this place because this item can hardly be considered as a primary earning asset.

and early summer when the turnover of money is lowest, due to slackened business conditions. The figures mentioned here are for late winter and early spring (of 1926), when requirements are neither at their maximum nor their minimum, and accordingly the figures may be considered fairly indicative of the average figure throughout the year.

National banks show the smallest amount of funds in their vaults, having only about 5.5 per cent of deposits, and in no case exceeding 15 per cent, even in the case of those banks which report their highest figures of the year. The requirement that all reserves be kept with the reserve bank, together with the ease with which additional funds may be obtained through rediscounting should the need arise, explains this low percentage. On the other hand, the amounts cited by state banks vary from ¼ of 1 per cent of one bank's deposits at this season to 40 per cent of the deposits of another during the rush season. Since the reserves of a state bank may be kept either in cash or on deposit with other banks, there is apparently little effort to hold till money down to the point where national banks keep it. State banks hold an average of 9.5 per cent of total deposits as till money while private banks average 10 per cent, a figure which is considerably raised by a 30 per cent till maintained by one bank.[13]

The amount of funds left on deposit with correspondents likewise follows seasonal fluctuations similar to those affecting till money, but in inverse sequence, deposits with correspondents tending to be low when till money is high, and vice versa. There is uniformity among the banks as to the amounts due from other banks at the time of this investigation, state banks averaging 25 per cent of their deposits with city banks, and national and private banks averaging 23 per cent of deposits with other banks. If allowance is made for the 7 per cent of deposits left with the Federal Reserve Bank by national banks, an average of only 16 per cent was left with correspondents.[14]

[13] Exclusive of this bank, the average till-money figure of private banks is 7 per cent.

[14] The greater part of these correspondents are located in Fort Worth, Dallas, and New York. As of March, 1926, 129 banks had Fort Worth correspondents, 96 had New York correspondents, and 83 had correspondents in Dallas. Of

Many of the banks show a high ratio of funds on deposit with other banks as compared with the amount of commercial paper held. Although the rate paid by correspondents is only 2–2½ per cent as compared with 4¼–4¾ per cent available on the purchase of commercial paper, many prefer to keep money with correspondents subject to immediate withdrawal, rather than to tie it up in commercial paper. Furthermore, state and private banks necessarily must keep a large amount of funds with correspondents to facilitate the clearing of checks, most of which is done through correspondent banks.

Of less significance to the earnings of the banks of this territory, but none the less a well-defined policy dealing with possibilities of profits, is the charging of fees for collection of checks drawn on out-of-town banks and presented for payment to the charging bank, a practice which is maintained by about 25 per cent of the reporting banks. This charge is frequently made only in the case of checks presented by persons who are not regular customers of the bank. Some of the banks charge merely the estimated cost of collection, but the most of them charge a fixed amount, $0.10, 0.12½, 0.15, or 0.25 per hundred dollars value of the check, or fraction thereof. This practice doubtless earns only a small return, but serves to pay for a service which otherwise proves of little value to a bank, and yet is very expensive.[15]

In this connection it should be noted that the system of clearing checks on out-of-town banks varies considerably from

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less importance in the order named were Wichita Falls (22), St. Louis (12), Kansas City (9), Houston (4), and Chicago (3). Several of the country banks in county seats or marketing centers serve as correspondents for smaller, outlying rural banks which usually keep only sufficient funds with the former to make possible the clearing of checks. Most national banks maintain New York correspondents, while the smaller state banks have a Fort Worth or Dallas correspondent. Several private banks have only one correspondent, and that a country bank (data taken from the *Bankers' Encyclopedia*. Detroit: R. L. Polk & Co., March, 1926).

[15] The only approximate estimates available in this connection are those from the comptroller's annual report, which shows this item forming about 4 per cent of the gross earnings of the banks of the Eleventh Reserve District, year ending June 30, 1925 (*Report of Comptroller of the Currency* [1925], p. 55).

bank to bank. While national banks typically clear through the Reserve bank, many of them maintain correspondents with banks which are members of some clearing-house association, usually at Fort Worth or Dallas, so that checks on banks in one of these cities[16] may be routed more directly. Both state and national banks in outlying sections frequently have correspondents in the nearest trade centers and shipping points, or the county seats, to expedite the clearings of checks; and since the larger towns become the centers of business activities for surrounding communities, it is not uncommon at certain seasons, particularly during the crop-moving season in the fall and the taxpaying time at the first of the year, for a large part of the checks drawn on the local bank to be presented directly at the correspondent's window for collection, and similarly for a large part of the checks presented to the local bank to be drawn in the correspondent's town. Thus collection is effected with little loss of time.

State banks as a group follow no definite plan for collection. Some keep funds with the Federal Reserve bank for collection of checks and clear directly through it; while others, because of certain objections to the Reserve bank or because it is more profitable to build up a balance with correspondents who will pay interest on these funds, clear through correspondents in Fort Worth or Dallas. These same factors determine the collection policies of private banks.

Practically all of the non-members of the Federal Reserve System have adopted the practice of remitting at par funds for payment of all checks drawn on them and presented at other banks for collection through the Dallas Reserve Bank. Only eight banks of the 168 banks of this district, or less than 5 per cent, were not on the Federal Reserve System's par-clearance list[17] on April 1, 1926. Of these, six are state banks and two are

[16] Particularly Fort Worth, for there is little time saved by clearing through the Dallas Clearing-house Association, since the Reserve bank can present checks for collection just as quickly.

[17] *Federal Reserve Inter-District Collection System Bulletin*, showing banks upon which items will be received by Federal Reserve banks for collection, January 1, 1926; Changes, April 1, 1926.

private. All are small banks; in fact, only one of them has sufficient capital to meet the present minimum capital ($17,500) required of state banks.

A source of some income, though probably productive of only a small amount,[18] is a fee charged for bills of exchange, drawn by country banks on banks in the money centers of the country. Approximately 45 per cent of the reporting banks charge a commission for such drafts, though the amount of the charge varies with the nature of the buyer's standing with the bank. National banks are apparently ahead of state and private banks in supplying this service to their customers, for several of the latter classes call attention to the fact that exchange is not handled. As the number of out-of-Texas correspondents is considerably smaller among the state and private banks than among the national banks, this practice may be readily accounted for. Any demand for it placed with these small banks is filled by drawing on Texas correspondents for New York or Chicago exchange; and since less than 3 per cent of the banks have correspondents in Chicago,[19] the bulk of the bankers' drafts made for the accommodation of customers is on New York banks.

Another source of income, which is peculiar to national banks, is the profit derived from the issue of national bank notes for circulation. Prior to 1917, a national bank was required to deposit registered United States bonds with the United States Treasurer,[20] which might be used to secure an amount of circulating notes equal to the par value of the bonds deposited, provided an additional deposit of 5 per cent of the amount of the notes was made in cash. The amount of the notes taken out by

[18] Allowance for this item is included in the 4 per cent gross revenues earned by the national banks on charges for collection of checks, as shown in the *Comptroller's Annual Report* (1925).

[19] Almost all the larger banks have correspondents in New York, while quite a few have them in St. Louis and Kansas City. Only three banks have Chicago correspondents.

[20] "Every association . . . . preliminary to the commencement of the banking business, shall transfer and deliver to the Treasurer of the United States any United States bonds to an amount not less than thirty thousand dollars and not less than one-third of the capital stock paid in" (National Bank Act, Sec. 5159. Repealed June 21, 1917).

the banks was optional with each one (the maximum that may be taken out in accordance with the law may not exceed the amount of paid-in capital). The amount of notes taken out by the national banks of northern Texas ranges from $6,250, in the case of one bank with a capital of $50,000, to $100,000 taken out by several others with a capital of that figure. The law requiring the deposit of these bonds with the Treasurer was amended by the act of June 21, 1927,[21] so that national banks organized since that day have been free to operate with no circulation whatever. As a result, only two of the fourteen reporting banks organized since that date have taken out circulation, one in an amount equivalent to its capital stock, and the other one-fourth of its capital. It would seem that the banks not taking out circulation have sufficient reason for this policy; for the higher the prevailing rate of interest on loans of a bank to its customers, the less the profit on circulating notes. In the case of a bank securing its notes with government consols maturing in 1930, this bank, charging a rate of 10 per cent on loans in October, 1925, would have made a profit of only 0.143 per cent on the 1930 consols, and 0.777 per cent on Panama Canal 2 per cent bonds, running until 1936. Assuming that these banks have an average capital of approximately $46,500, a sum $3,000 in excess of the average circulation of the banks in this region, and assuming that bonds should be deposited in an amount equal to the capital stock of each bank, the profit from bonds secured by consols of 1930 would amount to only $66.50 per annum, while the maximum return from Panama Canal bonds would be $361.30 per annum.[22]

[21] "So much of those . . . . provisions . . . . of existing statutes as require any national banking association now or hereafter organized to maintain a minimum deposit . . . . of bonds with the Treasurer is hereby repealed" (*ibid.*, Art. 302, Sec. 17).

[22] The average net price of $100,000 par value of consols of 1930, as of October, 1925, was $102,659. Interest per annum on the bonds is $2,000; interest on the $100,000 notes issuable, less interest, computed at 10 per cent on the $5,000 redemption fund, would amount to $9,500 per annum, giving gross receipts of $11,500. Taxes ($500), expenses of maintaining circulation ($62.50), and the sinking fund as of this date ($524.63) total $1,087.13, which leaves net receipts of $10,412.87. Interest on the cost of the bonds would amount to $10,265.90,

Three banks formerly maintaining circulation by United States consols have recently retired their notes because of the high prices of the bonds. As these bonds were quoted in New York at a premium exceeding 4 per cent in the latter part of 1924, the profit that would have been received on the circulation of these notes until 1930 would have been exceeded by the profit on the sale of the bonds, so that action similar to that of these three banks would apparently be justified by all those holding this type of bond.

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showing a profit of 0.142 per cent on the investment, above 10 per cent, as compared with 0.442 per cent cited by the Comptroller of the Currency as profit on such investment at 6 per cent.

Similarly, $100,000 par value of Panama Canal 2's averaged $101,000 for the same month. With the same gross receipts, but with sinking fund per annum of only $66.55, and taxes and expenses of circulation the same as above, the net profit from the circulation would amount to $10,870.95, or a margin of $770.95 above the 10 per cent interest on the cost of the bonds, which represents a profit on the circulation, in excess of 10 per cent, of 0.777, as compared with 1.001 per cent shown by the Comptroller as profit in excess of 6 per cent on the investment (cf. Report of the Comptroller of the Currency [1925], p. 215).

REPORT OF FEDERAL TRADE COMMISSION ON STOCK DIVIDENDS

SIGNIFICANT methodology and conclusions characterize the recent report on "Stock Dividends" compiled by the Federal Trade Commission.[1] Data for the report were drawn from several independent sources, including federal treasury records 1922–25, Poor's and Moody's manuals, the *Commercial and Financial Chronicle*, questionnaires mailed to a list of corporations selected from Poor's and Moody's manuals. Data gathered from the manuals and the *Chronicle* are regarded as the most representative of all the figures presented in the report, which is a matter of no small moment to those interested in research in corporate finance.

Discussion of methodology accompanies tabular summaries of the data. The tables themselves throw off useful sidelights on method. There are tables showing the ratios of cash, stock and "other" dividends to total dividends for two seven-year periods, 1913–19 and 1920–26.[2] Four groupings of data are employed in making up these tables: (*a*) concerns paying stock dividends in the second period but not reporting for all years in the two periods; (*b*) a second group similar to the first but reporting each year of the fourteen; (*c*) a third group like the second but reporting stock capitalization figures enabling further check on dividends; (*d*) a fourth group, selected from the manuals and chronicle, reporting for the entire period, paying stock dividends during both seven-year periods.[3]

[1] Dated December 5, 1927; in response to Senate Resolution 304, approved December 22, 1926.

[2] The Senate wished to learn the effect of the decision of the Supreme Court, that stock dividends are not taxable income to the shareholder (*Eisner* v. *Macomber*, 252 U.S. 189) upon corporate dividend policy. The decision was made public March 8, 1920, which was close enough to January 1, 1920, to make calendar years satisfactory accounting unit-periods.

[3] This sample avoids the probable bias of the others, since selection of items was made irrespective of whether or not stock dividends were paid in the second seven-year period. All the ratios show similar trends.

Then, there are tables showing ratios of cash, stock, "other" dividends, and total undistributed surplus at the close of each seven-year period to total surplus available for distribution for each such period. Next are given tables of the ratios of cash, stock, "other" dividends, and net increase in undistributed surplus for each period to surplus available for distribution attributable to each period.[4]

The conclusions are of broad significance. It is concluded that: (*a*) corporations distributed much larger ratios of total distributable surplus and of total surplus arising from operations of each period during the 1920–26 period than during the 1913–19 period; (*b*) this increase has been in the form of both absolute and relative increases in stock dividends in the later as compared with the earlier period. Cash dividends increased considerably during the second period when measured absolutely, but show little increase relatively.

The settlement, in 1920, of the issue concerning the tax status of stock dividends coupled with the possibilities of a heavy tax levy on surplus retained to allow shareholders to avoid surtaxes on cash dividends, plus the reduction in tax rates on individual incomes since 1920, have all been forces producing the increased distribution of stock dividends in the period 1920–26. Accumulated surplus and profits available for dividends have been such as to permit these distributions.[5]

The Commission finds that a very much smaller proportion of total surplus attributable to the later period remains undistributed than was the case in the earlier period. Since stock dividends do not lessen corporate resources, the actual profit reinvestment since 1920 probably has been greatly in excess of that from 1913–19 both absolutely and relative to total available surplus and to total surplus earned in the second period. These facts should be useful in a study of trends, since 1921, in

[4] Two groups of concerns are used: (*a*) one for corporations included in group *c*; (*b*) one for corporations of group *d*, mentioned in the foregoing paragraph.

[5] War profits plus the even greater returns since 1920. Losses of deflation in 1920–21 did not prevent profits for the 1920–26 period from outstripping those of the war period.

commercial bank loans and in bank investments under relatively stable price levels. It is possible that these tendencies may help to explain investment market trends, e.g., the relatively small proportion of total new security issues emanating from commercial and industrial sources, the continuous advance in bond and stock prices, etc.[6] It would be interesting to know how the inclusion of post-war losses in the data for 1920–26 would affect ratios of dividends to total surplus available for dividends and to total surplus attributable to this period.

The Commission deprecates the 1920–26 trend in stock dividend payments, but seems uncertain of its grounds for this opinion. It is urged that the practice of stock "split-ups" would give much the same results without reducing surplus and thus the protection of capital stock against losses. Obviously, per share protection is reduced in either case by reduction of book value per share, and there still exists the risk of the federal tax on undistributed surplus if a "split-up" rather than a stock dividend is used. Surplus is said to serve as a "reserve fund" out of which dividends may be paid in unprofitable years. The confusing use of accounting concepts is obvious and the writer wonders how many concerns consider the surplus as a fund in formulating cash dividend policies. There are too many other variables in the problem to make this generalization, as given, a safe one. The report acknowledges the values of capitalizing a surplus "invested" in fixed assets; but what of one invested in permanent working assets? All of this assumes an earmarking of resources quite difficult to obtain, if not impossible.

The report might well have warned against future payment of stock dividends on these grounds: (*a*) the affect of stock dividends upon probable future cash dividend requirements—each new stock dividend is paid on original issues plus prior stock dividends, which makes the affect on cash dividend requirements cumulative; (*b*) the necessity for careful estimation of future capital requirements and earning power to avoid in-

[6] The affect of a smaller demand for funds than would appear if reinvested profits were not so great; possible enhancement in values due to probabilities of "stock melons," etc.

vesting stockholders' funds to earn less than they could be made to earn by stockholders if paid out as cash dividends; (*c*) the advantages to stockholders of borrowing more funds at a cost below the earning rate and paying larger cash dividends. There seems less need for profit reinvestment as surplus now than during the war, when concerns were facing post-war readjustment.

One other point may be mentioned. Separate schedules were set up for data concerning corporations with no-par stock. The unstandardized accounting for this kind of stock seems to have caused the trouble. When, if ever, will our corporations adopt uniform accounting methods for no-par stock? When will accountants reach agreement on this matter?

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COMMENTS ON "THE INVESTMENT ELEMENT IN LIFE INSURANCE CONTRACTS"

MR. NERLOVE'S article, "The Investment Element in Life Insurance Contracts," is an interesting attempt to throw light upon the difficult subject with which it is concerned. From some points of view his conclusions are reasonably sound; but from others I think they may be fairly criticized. In the first place he has made his presentation rather difficult for his readers by adopting the analysis of the endowment policy which regards it as a combination of pure endowment insurance and level term insurance. Unfortunately this analysis does not show clearly the relationship between the whole life policy and the various endowment policies that are offered by the life insurance companies.

The modern life insurance contract, with its guaranteed cash and loan values, is more understandable to the average man when explained as a combination of (1) savings fund element which builds up the face of the policy at maturity, and (2) a decreasing term insurance element which provides for decreasing term insurance of such an amount that the sum payable in the event of death in any year will be exactly the difference between the accumulated savings fund and the face of the policy. Using this explanation, the ordinary life policy is simply an endowment at age 96, which is the limiting age of the mortality table usually used. The endowment policy maturing at a younger age, as 70, 65, or 60, involves the same principles as the ordinary life. Because of the shorter accumulation period the investment element is larger and the decreasing term insurance element is smaller.

The article seems to assume that the twenty-year endowment is the only endowment that one can satisfactorily buy. As a matter of fact, life insurance men are coming more and more to realize that the endowments which mature at the close of a man's prospective business career are likely to be more satisfactory than those which mature when he is in the prime of life. For example, an endowment maturing at age 65 is likely to be much more satisfactory for a young man of 25 or 30 with a family than an endowment maturing in twenty years. Life in-

surance performs its greatest mission when it protects a man's dependents during his active business life and then protects him and his dependents after his income-earning power has been impaired by old age. For this reason the average life insurance contract should not be looked upon as a short-term proposition. It is not designed as such, and the returns available after the contract has been carried for a relatively short period are likely to be small. This is clear from the figures which Mr. Nerlove has presented.

Mr. Nerlove has also found difficulty in choosing a satisfactory base policy. He has taken the ordinary life policy as against the elementary form of term insurance. This is probably justifiable, but it means that his article relates simply to the return on the additional amount of money that a man will pay under a life insurance policy calling for a premium larger than that on ordinary life. It throws no light whatever upon the return upon the considerable investment element in the ordinary life policy itself. It is interesting to note that in various places in the article Mr. Nerlove seems to have different thoughts about the investment element in the ordinary life policy. For example, in Section III this sentence occurs: "Accordingly, this policy (ordinary life) has both a significant cash value and a large policy loan value." Since in practically all companies after the early policy years the cash surrender value and the loan value are identical, the two adjectives mean the same thing. In the footnote relating to Table III this sentence occurs: "Although the ordinary life policy contains a very low investment element, it, nevertheless, is the most convenient and easily obtainable insurance contract." Then in footnote 44, speaking of the ordinary life contract, this sentence occurs: "This policy, however, contains a significant investment element."

In essence, what Mr. Nerlove has done has been to find out certain facts about the compound interest return under assumed conditions upon the amount of money that a man may pay in excess of the ordinary life premium should he buy a twenty-payment life policy or a twenty-year endowment policy, the period of the return being considered in no event beyond twenty years. Mr. Nerlove computes this return on the assumption that the policyholder will live the given period, and then modifies the conclusions by introducing a mortality factor showing the probability that a man will die within the given period. As stated before, one criticism I would make is that for many of the ages the period chosen is too short. However, waiving the objection to the shortness of the period, I have never been able to get any clear

conception of the relationship between any two contracts by having a probability-of-death factor introduced along with a compound-interest factor. In such analyses as I have made, the greatest satisfaction and clarity has come from using the elementary term cost and determining from that the return on the investment element in ordinary life and other contracts.[1] This is independent of the probability-of-death factor, and is I think much more intelligible to the average reader.

In several places in the article stress is laid upon the fact that the investment part of the life insurance premium is tied up with other contingencies, so that if the cash surrender value is withdrawn, the life insurance feature is thereby automatically canceled. Many people consider this feature a strong one in the life insurance plan. There is such a tendency nowadays to divert accumulated funds to temporary purposes that from the point of view of protection throughout life it is highly desirable to have some check upon their ready use. In this connection it should be made very clear that after the policy has been in force for a few years, the life insurance company stands ready to advance or loan an amount equal to the cash surrender value. All the policyholder has to do is to pay interest on the amount so advanced. Should the policy become a claim, the company will pay the face of the policy less the amount advanced.

In this article Mr. Nerlove seems to have ignored the very general human tendency to dissipate accumulated funds, because temporary enjoyment overshadows the needs of future years. When the investment element is linked up with the important feature of life insurance protection, the policyholder is likely to hesitate before diverting the funds to some temporary purpose. The periodical premium is a satisfactory way of making the investment, and the system which the life insurance companies have of sending premium notices and following up overdue premiums tends to the completion of the program in a way that would hardly be said to characterize the independent investment plan.

One's attitude toward a given problem is always likely to be influenced by subjective considerations. For example, my own permanent insurance is all carried on a plan which will pay me the face value of the insurance if I am living on definite dates between the ages of 60 and 68. The additional premium which this form of insurance costs

[1] This has been done in a pamphlet, *Life Insurance as an Investment*, available at 10 cents a copy from the National Association of Life Underwriters, 11 West 42nd Street, New York City.

over and above the cost of ordinary life insurance might *theoretically* be invested with greater profit on an independent basis over a period of say twenty or thirty years. I am inclined to think, however, that in my case the fund is much more likely to be intact at the maturity age if I intrust the money to the life insurance company. And I doubt if I am alone in this position.

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REPLY TO MR. LINTON'S COMMENTS

Mr. M. A. Linton's criticisms of my paper indicate that I have not presented my position with reference to the investment element in life insurance contracts clearly. It is hoped that in considering each one of Mr. Linton's criticisms increased clarity will be attained.

The first and perhaps major objection Mr. Linton voices is that I have made my presentation difficult for my readers by suggesting that the endowment policy is a "combination of pure endowment insurance and level term insurance." He points out that the modern life insurance contract is "more understandable to the average man when explained as a combination of (1) savings fund element which builds up the face of the policy at maturity, and (2) a decreasing term insurance element which provides for decreasing term insurance of such an amount that the sum payable in the event of death in any year will be exactly the difference between the accumulated savings fund and the face value of the policy."

This point of view probably will not lead a life insurance company to erroneous conclusions, but is very likely to lead life insurance buyers to such conclusions. It is true, from the point of view of an insurance company, that, let us say, a $1,000 ordinary life insurance policy is always not a $1,000 ordinary life insurance contract. If on that contract $200 has been prepaid and accumulated, in case death occurs the insurance company will have to pay only $800 of its own money in view of the fact that it does not return prepaid insurance premiums and accumulated interest on them, that is, "cash surrender values." But from the point of view of a life insurance buyer, a $1,000 ordinary life insurance policy is always a $1,000 ordinary life insurance policy. When he purchases such a contract he has obtained a life-risk reduction service, which assures him during his lifetime that his family will

obtain a $1,000 at his death. It so happens that if he purchases this contract on a level premium basis plan he will have to pay more during the early years of the policy than the service is "worth," so that in the later years of his contract (if it has not matured in the meantime) he will be able to pay less than the service is "worth," thereby equalizing his annual payments, whereas the price of the service actually rendered is increasing each year. To suggest that this "prepayment method" of paying premiums results in making a life insurance contract a combination of a savings fund and decreasing term insurance is likely to mislead life insurance buyers, particularly when it is possible to buy contracts which call for different amounts of "prepayment," although the life insurance services rendered are practically the same.[1]

Accordingly, Mr. Linton's contention that an ordinary life policy "is simply an endowment at age 96" is inaccurate. When one buys an ordinary life policy he purchases assurance that his dependents will get the face value of the policy in case of his death. It so happens that according to the mortality table usually used in determining the price he has to pay for this life-risk reduction service, whether he is dead or not, he "should" be dead by the time he reaches 96 (the limiting age of the mortality table). Consequently, if he is living then, the insurance company pays him the face value of the policy. All of this arises out of the kind of mortality table used. Change the limiting age of the mortality table and the time at which payment is made will be altered.

Mr. Linton's second criticism seems to be that I should have considered endowment policies for a period longer than twenty years. From the point of view of completeness he is quite right. At the time the study was made it appeared to me that an investigation of what would happen under a five, a ten, a fifteen, and a twenty year period would be sufficient to cover all significant cases and afford an adequate basis for generalizations. In terms of the results obtained, a more complete investigation, including, let us say, twenty-five, thirty, thirty-five, forty, and forty-five year endowments probably would not have changed the generalizations developed.

In his next criticism Mr. Linton suggests that my generalizations apply "simply to the return on the additional amount of money that a man will pay under a life insurance policy calling for a premium larger than that on an ordinary life." Apparently I failed to make clear that rates of return shown were a conservative estimate of the amount that

[1] See p. 281 of the article "Investment Element in Life Insurance Contracts," *Journal of Business of the University of Chicago*, Vol. I, July, 1928.

would be obtained if the term policy was used as a base.[2] In this connection he claims that I have "different thoughts about the investment element in the ordinary life policy" because I suggest that the ordinary life contract has both a "significant" and a "low" investment element. Is it not possible that a "low" investment element may also be a "significant" one?

Mr. Linton's objection to the use of the probability-of-death factor I cannot understand. If the investment element or cash surrender value is lost upon the occurrence of death, then it is essential in determining whether or not it is advisable to invest with a life insurance company to take into consideration the probability-of-death factor. How else could one measure the risk assumed in making such an investment? And is it not essential to measure the risk involved in determining whether or not a given investment is desirable?

Finally, Mr. Linton criticizes my paper because it gives no attention to the probability that investment life insurance policies should be purchased because they compel persons to save. Perhaps high-priced life insurance policies do increase savings and avoid dissipation of accumulated funds. But this is a psychological matter, a matter of "will power." The purpose of the study was to give an adequate answer to the question: Is it advisable, from the individual investor's point of view, to purchase investment life insurance policies for *persons who have sufficient "will power" to guide their own actions.*

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[2] *Ibid.*, footnote to Table III, p. 288.

RADIO ADVERTISING

A STUDY of the use of radio as an advertising medium, made in October and November, 1927, revealed a number of interesting facts. The study was confined to metropolitan Chicago and consisted of one thousand personal interviews with owners of radio receiving sets. The objectives were to obtain facts about the size of the radio audience, about its attitude toward the use of radio for advertising, about its entertainment likes and dislikes, and about listening habits.

Following are the important conclusions reached through the study:

1. During the autumn of 1927 the largest number of radio sets was in operation daily between seven and nine o'clock in the evening. The peak was reached between eight and nine.

2. The number of sets in operation before seven and after nine in the evening was considerably less than between seven and nine—at least 25 per cent less. The hour between nine and ten had a somewhat larger listening audience than the hour between six and seven.

3. The radio audience reached its largest size between seven-thirty and eight-thirty in the evening. Approximately 60 per cent of all the receiving sets in Chicago were in use daily during this hour.

4. In the autumn months the average receiving set was in use between three and four hours a day. The average was slightly higher in midwinter and much lower in midsummer.

5. The total volume of radio listening in midsummer was about one-half that in the late autumn. It was about one-third more in midwinter than in the late autumn.

6. In the evening hours the average number of listeners per family slightly exceeded three. At all other times of day it slightly exceeded one.

7. Programs of national advertisers which were of high quality and which had been carried on over a long period of time had a large following among listeners. This applied both to classical and to so-called popular programs.

8. A substantial number of local Chicago programs classifying as

station features had a following which compared favorably with the best programs of national advertisers broadcasting over chains.

9. The great majority of listeners in Chicago owned multi-tube sets of one of twenty-five makes.

10. Four broadcasting stations in Chicago ranked far ahead of all others as advertising media. All others either had a scattered following throughout the city or confined their influence entirely to local groups of listeners. Each leading station appealed to all classes of listeners. No station had built up a large class following.

11. Sport events and musical programs far outranked all other types in popularity with all classes of listeners. Classical music compared very favorably with lighter forms of entertainment in popularity.

12. Listeners were about evenly divided between those who preferred local Chicago programs and those who preferred chain broadcasts originating in New York.

13. There was no appreciable body of sentiment opposed to the publicity or radio-hour type of advertising when programs were of high quality and the advertising factor was kept in the background.

14. There was strong sentiment against the use of radio for selling or shopping talks. This type of advertising nevertheless had a fairly substantial following among listeners.

15. Both the publicity and shopping talk types of radio advertising had directly influenced the purchasing of a considerable number of listeners.

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RECENT CHANGES IN LOCATION AND SIZE OF PETROLEUM REFINERIES

MANY changes have occurred during the past decade in the geographical location of industrial activity in the United States. A number of shifts have taken place with resulting changes in the relative importance of the different areas as producers of various commodities. In some industries a closer proximity to sources of raw materials and cheaper labor supply has been sought, while in others the movement has been in the direction of proximity to markets for the finished product.

Considerable attention has been paid to the changes in the textile industry, especially to the declining importance of New England, as contrasted with the growing importance of the southeastern portion of the country. Little attention, however, has been given to the geographical changes taking place in the petroleum refining industry. The value of its product in 1925 was close to two and a half billion dollars, thus ranking it among our prominent industries.

Changes in the capacities of petroleum refineries in the United States during the period 1918–28 indicate two significant trends. In the first place there is a definite gravitation away from the interior of the country toward the seaboard regions of the Atlantic, Pacific, and Gulf coasts (see Table I). This trend has not been characteristic of the whole period. From 1918 to 1920 the inland area was increasing its percentage of the country's total operating refining capacity, but during 1920–28 its importance as compared with the coastal regions has been falling constantly from 51.0 per cent in 1920 to 36.1 per cent in 1928. The coastal areas, on the other hand, increased in importance from 49.0 per cent of the total in 1920 to 63.9 per cent in 1928. In the second place there is a marked increase in the size of individual refineries in the United States. From an average operating capacity of 4,442.5 barrels per day in 1918 the size of plant has grown until in 1928 it reached an average of 9,313.3 barrels daily operating capacity.

In order to see in greater relief what has taken place in the country at large the central part of the United States, including the coastal and inland areas, was selected for special study. This section was chosen primarily because of its size and importance as a producer of

crude oil and refined products. Although this area has declined in its relative importance as a refining center since 1920, nevertheless in 1928 it still had 46.3 per cent of the total operating capacity of the country.

The central United States was broken up for purposes of study into four groups comprising several states and parts of states on the basis of their relationship to transportation facilities, markets, and crude petroleum supplies. Table II shows what has taken place in these groups during 1918–28. The marked feature is the rapid decline

TABLE I

A COMPARISON OF DAILY OPERATING CAPACITY OF REFINERIES IN THE INTERIOR AND IN COASTAL REGIONS OF THE UNITED STATES

YEAR	UNITED STATES		COASTAL REFINERIES		INLAND REFINERIES	
	Number of Barrels	Percentage	Number of Barrels	Percentage	Number of Barrels	Percentage
1918	1,186,155	100.0	655,240	55.2	530,915	44.8
1919	1,295,115	100.0	676,900	52.3	618,215	47.7
1920	1,527,065	100.0	748,485	49.0	778,580	51.0
1921	1,788,095	100.0	986,400	55.2	801,695	44.8
1922*	1,854,990	100.0	1,039,060	56.0	815,930	44.0
1924*	2,480,922	100.0	1,525,120	61.5	955,802	38.5
1925*	2,594,317	100.0	1,614,320	62.2	979,997	37.8
1926	2,562,357	100.0	1,597,350	62.3	965,007	37.7
1927	2,834,282	100.0	1,816,425	64.1	1,017,857	35.9
1928	3,036,125	100.0	1,940,420	63.9	1,095,705	36.1

* Figures are those of July, 1922, November, 1924, and May, 1925. All others are of January
Source: Bureau of Mines, Washington, D.C.

since 1920 in the position of prominence occupied by Group II (central and northern Texas, Oklahoma, and Kansas) as contrasted with the growing importance of Group IV (Gulf coast and Texas and Louisiana). The shift very noticeably is away from the area which is closest to the crude oil wells and toward the Gulf coast region. The reverse was true during 1918–20. Group II, generally known as the Mid-Continent, shows the most marked decline during the past ten years. Especially striking is it when viewed from the standpoint of the relationship between its crude oil production and its refining capacity. In 1918 the Mid-Continent produced 50.4 per cent of the country's crude petroleum. By 1927 it had increased it to 60.7 per cent of the national production. This growth in crude oil production, however, was not paralleled by an increase in refining capacity. On the contrary, it went from an operating refining capacity of 27.4 per cent of the national

TABLE II

A Comparison of Various Areas in United States with Respect to Operating Capacity of Petroleum Refineries
(In Thousands of Barrels)

Year	United States		Atlantic Coast		Pacific Coast		Rocky Mountains		Appalachian		All Except Central U.S.	All Central U.S.	Central United States							
													Gulf Coast Group IV Gulf Coast of Texas and Louisiana		Group III Arkansas and Louisiana		Group I Missouri, Iowa, Illinois, Indiana, Western Ohio, Kentucky, and Tennessee		Group II Central and North Texas, Oklahoma, and Kansas	
	Barrels	Percentage	Barrels	Percentage	Barrels	Percentage	Barrels	Percentage	Barrels	Percentage	Percentage	Percentage	Barrels	Percentage	Barrels	Percentage	Barrels	Percentage	Barrels	Percentage
1918.....	1,186	100.0	176	14.9	283	23.9	33	2.8	68	5.8	47.4	52.6	195	16.5	5	0.5	97	8.2	325	27.4
1919.....	1,295	100.0	189	14.6	280	21.7	54	4.2	67	5.3	45.8	54.2	206	15.9	5	0.5	116	9.0	373	28.8
1920.....	1,527	100.0	206	13.5	310	20.3	66	4.4	74	4.9	43.1	56.9	231	15.2	11	0.7	149	9.8	476	31.2
1921.....	1,788	100.0	407	22.8	312	17.5	70	3.9	78	4.4	48.6	51.4	266	14.9	30	1.7	164	9.2	458	25.6
1922*.....	1,854	100.0	419	22.6	314	16.9	99	5.3	82	4.5	49.3	50.7	305	16.5	32	1.8	175	9.5	425	22.9
1924*.....	2,480	100.0	462	18.6	654	26.4	134	5.4	91	3.7	54.1	45.9	408	16.5	49	2.0	186	7.5	493	19.9
1925*.....	2,594	100.0	469	18.1	700	27.0	109	4.2	89	3.5	52.8	47.2	444	17.1	50	2.0	210	8.1	519	20.0
1926.....	2,562	100.0	476	18.6	669	26.1	118	4.6	95	3.7	53.0	47.0	452	17.7	64	2.5	215	8.4	470	18.4
1927.....	2,834	100.0	522	18.4	784	27.7	121	4.3	90	3.4	53.8	46.2	510	18.0	76	2.7	228	8.0	494	17.5
1928.....	3,036	100.0	575	19.0	816	26.9	135	4.4	103	3.4	53.7	46.3	548	18.1	71	2.4	275	9.1	509	16.7

* Figures are those of July, 1922, November, 1924, and May, 1925. All others are of January. Source: Bureau of Mines, Washington, D.C.

total in 1918 to 17.5 per cent in 1927, and fell again to 16.7 per cent by 1928. Since this area produces more crude than it refines, the question arises as to what happens to its surplus crude. Some of it is piped into the North Central states to supply the refineries of Group I, especially those located in the Great Lakes region. Still more goes by pipe line into the Gulf coast region of Texas and Louisiana. The rest of the crude finds its way into the refineries of the Atlantic coast.[1]

While Group II has been declining in relative importance, Group IV on the other hand has been growing so that by 1928, 18.1 per cent of the total operating capacity of the country was located in the Gulf coast area. Group III (Arkansas and northern Louisiana), a comparatively new refining region, has made definite increases in its relative importance from 0.5 per cent in 1918 to 2.4 per cent of the nation's total in 1928. The fluctuation in the relative position of Group I (Missouri, Iowa, Illinois, Indiana, western Ohio, Kentucky, and Tennessee) was comparatively slight until the addition of refining capacity during 1927 increased its relative importance by 1.1 per cent of the national total. A significant aspect of Table II, then, from the standpoint of Central United States, is the decline in the relative importance of the interior, particularly the Mid-Continent region, and the increase in the relative importance of the Gulf coast region of Texas and Louisiana as a refining center.

What has happened to the position of importance occupied by the Central United States in 1918? What was its relative importance during 1918–28? How did it compare with other areas in the country? To make this comparison the country was divided into five large areas.[2] The Pacific coast area includes refineries located in California and Washington. The Rocky Mountain area comprises all the refineries in Arizona, Colorado, Montana, New Mexico, Utah, and Wyoming. The Appalachian area includes all the refineries in West Virginia, those in Pennsylvania (except those located in Philadelphia, Petty Island, and Marcus Hook), all in New York (except those located in Brooklyn and Long Island City), and the refineries of Ohio located in Cleveland, Heath, Marietta, and Marne. The exceptions mentioned are included in the Atlantic coast area together with the refineries in Georgia, South Carolina, Virginia, Maryland, New Jersey, Rhode Island, and Massachusetts. The other large area is the Central United States.

[1] E. B. Swanson and A. H. Redfield in *Bureau of Mines Information Circular No. 6061* (February, 1928), p. 2.

[2] These are the divisions used by the Bureau of Mines.

A striking feature in Table II is the declining importance of the Central United States when compared with the other areas, although as a single large unit it still is the most important. The decline in its relative position has been quite constant since 1920. Also marked is the steady decline in the relative importance of the Appalachian area. The areas which have increased in importance from 1918 to 1928 are the Atlantic, Pacific, and Gulf coasts, the Rocky Mountain area, and that region in the Central United States comprising Arkansas and northern Louisiana. All of the other areas have decreased. The two areas which have been so markedly losing their relative importance are the oldest crude producing and refining areas which in previous days were the foremost in the country.

It is important to note that although the shift in operating capacity has been decidedly away from the interior toward the coastal regions, this shift did not come at the same time in all the regions. During 1918–20 the inland areas increased their relative importance while the coasts decreased. From then on the coastal regions grew to the dominating position reached in 1928. Nevertheless, as indicated in Table II, the shift in the relative importance of each of the three coasts was not uniform by period.

The growth of refining capacity on the Atlantic coast from 14.9 per cent of the nation's total in 1918 to 19.0 per cent ten years later is worth noting. The increase has been in response to the comparatively easy access to crude petroleum supplies through the use of oil tankers. The addition of refining capacity during 1927–28 was primarily for the purpose of refining the readily accessible crude from Venezuela. Despite the increase in operating refining capacity, the Atlantic coast still lacks the ability to supply its regional demands. It only produces about 49 per cent of its gas oil and 51.5 per cent of its fuel oil needs. The deficiency has to be imported from other regions. This large profitable market coupled with the increasing facility for securing crude petroleum cheaply from Venezuela bids fair to expand farther the refining capacity of this area.

The Pacific coast, too, has made advances in its relative importance as a refining area, especially since 1922. Between 1922 and 1924 the refineries in this area increased their operating capacities from 16.9 per cent to 26.4 per cent of the national total. It was during this period that discoveries in Los Angeles Basin increased the annual production of crude petroleum from 138,468,000 barrels in 1922 to 228,933,000 barrels in 1924, a peak of 262,876,000 barrels having been

reached in 1923. By the end of that year and during 1924 an increase in refining capacity was stimulated to handle this increase in crude oil. The result of this expansion was the production of gasoline and fuel oil in excess of regional demands. During 1925 and 1926 the refineries produced close to 50 per cent more gasoline than the area consumed. Shipments of California gasoline to the Atlantic coast area consequently increased from 2,904,000 barrels in 1924 to 9,807,000 barrels in 1925, with 1926 shipments at 8,453,000 barrels. This in part reduced the market for Mid-Continent gasoline.

The two large consuming areas for petroleum products are the North Atlantic states and those states bordering on the Great Lakes. These regions do not produce enough to meet their local demands, and hence import from those areas which produce beyond regional requirements. Of these latter regions the Mid-Continent was the foremost at one time, but has been falling in its relative importance since 1920 primarily because it is losing its markets. There are two main factors affecting the extent of the market for Mid-Continent refined products. One is the tendency to increase refining capacity in the two largest consuming areas, and the other is the increase in operating refining capacity in those areas from which distribution is more readily possible by water transportation. The Gulf coast refineries and the California refineries being in a position to avail themselves of the cheaper tank steamer rates thus have an advantage over the Mid-Continent refineries which are obliged to pay the higher tank car rates.

Changes also took place in the size of refineries. It can be stated generally that since 1920 their average size (measured by dividing the total operating capacity by the total number of plants) in Central United States has been constantly increasing. The same is true of practically each group of states within this area. At the same time the average size of refinery shut down in this area has been small. With the exception of 1926 and 1928, it has been always less than 2,000 barrels daily capacity. The movement in the direction of large-size plants is indicated in Table III. The most phenomenal growth took place in the Gulf coast region and in the region comprising Arkansas and northern Louisiana. Even during 1920, when all the other areas dropped in size of plant operating, the latter region continued to grow. The movement toward large-size refineries in the Central United States is just an example of what is taking place in the country at large.

An interesting trend in the average size of refinery shut down or

eliminated during the past few years in the central part of the country is presented in Table IV. The average size of plant shut down was ar-

TABLE III

AVERAGE OPERATING CAPACITY OF REFINERIES IN THE VARIOUS PARTS OF CENTRAL UNITED STATES
(BARRELS DAILY)

Year	Central United States	Group I Missouri, Iowa, Illinois, Indiana, Western Ohio, Kentucky, and Tennessee	Group II Central and Northern Texas, Oklahoma, and Kansas	Group III Arkansas and Louisiana	Group IV Gulf Coast of Texas and Louisiana	United States
1918.....	4,078.4	3,919.2	3,126.5	629.4	13,013.3	4,442.5
1919.....	3,966.6	4,325.0	2,870.6	954.2	14,742.9	4,481.4
1920.....	3,697.7	3,944.0	2,802.4	1,594.3	11,576.8	4,094.0
1921.....	4,355.9	4,823.5	3,137.0	3,040.0	12,700.0	5,108.8
1922*....	4,700.5	4,503.8	3,407.2	2,190.0	14,557.1	5,707.7
1924*....	5,661.8	6,225.0	3,882.5	2,361.4	17,765.2	6,949.4
1925*....	6,098.4	6,804.8	3,965.9	2,529.5	23,405.3	7,104.6
1926.....	6,644.2	7,195.8	4,198.2	2,567.8	21,538.1	7,279.4
1927.....	7,845.7	7,869.0	4,900.5	4,798.8	24,300.0	8,667.5
1928.....	9,183.9	10,220.4	5,247.4	5,529.2	34,270.0	9,313.3

* Figures are those of July, 1922, November, 1924, and May, 1925. All others are of January.
Source: Bureau of Mines, Washington, D.C.

TABLE IV

AVERAGE CAPACITY OF REFINERIES SHUT DOWN OR ELIMINATED IN THE VARIOUS PARTS OF CENTRAL UNITED STATES, 1921–27

Year	Central United States	Group I Missouri, Iowa, Illinois, Indiana, Western Ohio, Kentucky, and Tennessee	Group II Central and Northern Texas, Oklahoma, and Kansas	Group III Arkansas and Louisiana	Group IV Gulf Coast of Texas and Louisiana	United States
1921.....	1,825.0	800.0	2,063.6	375.0	316.7	1,452.4
1922*....	1,766.0	1,125.0	1,900.0	1,707.7	1,117.8	1,653.3
1924*....	1,900.6	1,297.8	2,126.9	959.3	2,273.6	1,754.8
1925*....	1,946.8	1,207.1	2,185.5	1,355.0	2,180.4	1,848.8
1926.....	2,043.5	981.3	2,274.4	1,040.9	4,000.0	2,270.4
1927.....	1,701.4	960.0	1,901.3	1,042.5	3,166.7	1,642.9
1928.....	2,580.3	1,877.3	2,464.2	1,692.5	4,928.6	2,208.8

* Figures are those of July, 1922, November, 1924, and May, 1925. All others are of January.
Source: Bureau of Mines, Washington, D.C.

rived at by the method used for the determination of average size operating. Figures for this particular phase of the study were not available before 1921. The average size of refinery shut down dropped from a

little more than 1,800 barrels daily capacity in 1921 to 1,700 barrels per day in 1926–27. The increase in size of refinery shut down during 1927–28 is due to the fact that in the refinery census for 1928 the plants which have been shut down for at least five years were removed from the list. The exclusion of the smaller plants from the tabulation caused the average to increase.[3] It is noticeable that in Group I there has been a decline in size of plant shut down during 1925–27. The same is true of Group III. The average capacity of plants shut down in Group II has never been much above 2,400 barrels daily, and on two occasions, in 1922 and 1927, fell below 2,000 barrels daily. In the Gulf coast region the average size shut down increased from 316.7 barrels daily in 1921 to nearly 5,000 in 1928. Compared, however, to the average size of refinery operating in this region (34,270 barrels daily capacity), the plants of 5,000 barrels daily average capacity which were shut down are small. All this points to the fact that during the past few years the tendency has been for the smaller and less fully equipped refineries, at least in the Central United States, to be shut down or eliminated.[4]

The trends indicated furnish leads for further studies. The shifts in the geographical location of refineries suggest that in general they have been going toward strategic location with reference to markets rather than coming into closer proximity to raw materials and available supply of cheap labor. The nature of the refining industry is such that labor cost does not play the important rôle it does in some other industries. The increase in size of refinery prompts the question of technical changes that have taken place and what were the economic advantages they created. Transportation was probably an important factor in determining geographical reallocation. If so, what rôle did the freight differentials in tank-car, tank-steamer, and pipe-lines transportation play in the changes which have taken place? These and similar questions raise issues upon which further study and research are needed.

J. SIDNEY GOULD

ROBERT BROOKINGS GRADUATE SCHOOL

[3] G. R. Hopkins, in *Bureau of Mines Information Circular No. 6065* (April, 1928), p. 1.

[4] *Ibid.*, p. 1.

BOOK REVIEWS

Income Tax Procedure, 1927. By ROBERT H. MONTGOMERY. New York: Ronald Press Co., 1927. Pp. Vol. I, xiv+1468; Vol. II, iv+576. $16.00.

This, the eleventh annual edition of this standard handbook on income-tax problems and procedure, has been issued in two volumes. Following the lines of natural division set up in the revenue law, the substantive sections, dealing with the kinds of taxpayers, definitions of income, deductions, and the like, are discussed in Volume I, entitled, "Determination of Net Income and Tax, Preparation of Returns and Payment." The procedural sections of the law, dealing with details of the administration of the law, which becomes applicable in general only after the return has been or should have been filed, are treated in Volume II, entitled, "Practice before the Treasury, Board of Tax Appeals, and Federal Courts." This division of the subject matter is particularly conducive to ready reference.

These volumes are devoted exclusively to federal income-tax procedure. They have been rewritten to incorporate the developments of 1926, and consequently all matter has been eliminated which was not deemed to be absolutely essential to current tax procedure. All features of the 1926 law are discussed in detail with the object of fully protecting the interests of taxpayers.

The author, in the preface, criticizes certain aspects of federal income tax and treasury procedure. First, he severely criticizes the political practice of "tax reductions as Christmas presents" (the practice of making partial returns on the excessive tax funds built up by inefficient tax systems) as being conducive to political corruption and as being most unscientific and uneconomical. Second, the problem of excessive tax collection is becoming a greater evil because there are no reasonable means whereby excessive and erroneous taxes may be recovered. Either the Treasury should be required to expedite the adjudication of doubtful tax problems, or taxpayers who follow the Treasury regulations automatically or under duress, in making their payments, should be protected when, as, and if any regulation is found to be illegal or erroneous. Third, certainty has long been a criterion of

taxation; hence any tax law which contains restrospective provisions is intolerably bad because not conducive to the orderly conduct of business. (The 1926 law, passed February 26, 1926, was retroactive to January 1, 1925.) Lastly, the 1926 law, through its inclusion of sections interpreting previous laws, and retroactively changing such previous laws, introduces what may become the most vicious of all the policies which have marked our complicated federal tax systems. These sections constitute a barefaced disregard of court and Tax Board decisions which have interpreted previous laws, and serve to nullify some of the decisions of the courts and Tax Board. This method must have the effect of destroying orderly judicial procedure. These criticisms, in the large, are justified.

The procedural side of the income tax laws has had a rapid and distinctive development during the past year as a result of the functioning of the Board of Tax Appeals. Appeals are now taken to the Treasury, to the Board of Tax Appeals, and finally to the federal courts. All of the significant cases and decisions are summarized. Although the preparation of tax returns has been much simplified with the passing of the profits tax and the introduction of drastic rate reductions, there is as yet nothing simple about procedure when the Commissioner of Internal Revenue finds, or gives notice of, a deficiency arising out of the examination of a return. A complete corps of lawyers, accountants and income "tax experts" is necessary adequately to protect the taxpayers' interests.

Particular commendation is due the author and publishers for the excellent system of references, appendixes and indexes. The analytical index preceding each chapter is particularly helpful. Over 216 pages are devoted to general and special indexes, thus making it extraordinarily easy to locate the solution for any problem which may arise. The appendixes containing detailed information on procedure on appeal, and the text of the Revenue act of 1926, make the book indispensable to tax attorneys. The book contains everything the taxpayer needs to prepare, safeguard, and defend any return from the simplest to the most complicated. A word of praise for the excellent typography throughout the book, which facilitates ready reference, must also be given.

W. C. CLEVELAND

INDIANA UNIVERSITY

Principles of Window Display. By JAMES H. PICKEN. Chicago: A. W. Shaw Co., 1927. Pp. 436.

Numerous examples, illustrations, and rules in one-two-three-four order make this text an excellent handbook for the retailer who wishes to check his window display procedure. To the student of advertising the book is of value because much fugitive material is brought together.

The author makes use of his six rules for effective letter writing and evolves six similar rules for effective treatment of windows. Both the merchandising calendar and the list of display ideas would be suggestive to the retailer. A real lack in the book is the omission of a discussion on how much space can be allotted to window display, how much rent should be charged to this space, and how much of the rent should be charged back to the departments using the windows. Even small-town merchants are concerned with this problem.

There is a good discussion of the co-ordination of window display with other forms of advertising and with selling.

KARL D. REYER

WITTENBERG COLLEGE

Accounting. By PAUL-JOSEPH ESQUERRE. New York: Ronald Press Co., 1927. Pp. v+369. $4.50.

This book covers the general theory of accounting interpretation and valuation. Chapters i–vii, which comprise something less than one-half of the book, are devoted to specific problems in the construction of balance sheets and other financial statements with a view to making them more useful to business men. Chapters vii–xvi deal with asset valuation, under the general headings of "fixed assets," "intangibles," "investments," and "inventories." The book closes with a brief discussion of funded debt and proprietorship. A notable fact about this book is the absence of footnotes or specific citations to similar works. The author makes no reference to other texts or to articles which are in agreement with, or contrary to, his point of view.

C. R. REM

UNIVERSITY OF CHICAGO

Paper Currency in India. By B. B. DAS GUPTA. Calcutta: Calcutta University, 1927. Pp. xviii+331.

As Professor Coyajee remarks in his foreword to Mr. Das Gupta's volume, "the literature of Indian currency is already rich and has of late been increasing in volume." Part I of this latest contribution is a discussion of the paper issues of the Indian Banks before 1861. In that year the Indian government was given a monopoly of note issues, and Part II contains a history of these government issues. The author traces in turn the history of the agency, the mechanism, and the cover of the issue.

The final chapter is a sanely critical analysis of the recommendations of the Hilton-Young Commission, the most recent of India's many currency commissions. Like Keynes, the author favors a "managed" rupee standard because he believes that greater stability of the domestic price level might be secured by such a standard. However, he accepts with resignation the gold standard recommended in the commission's report. He supports the proposal of a central reserve bank with monopoly of note issue, though he fears that, for a time, the notes of the central bank may be accepted less readily than the government notes which they are to replace. He criticizes the detailed regulations designed to insure convertibility. If the bank is to be trusted with the issue function it should be trusted also to maintain convertibility by limiting the issue.

Though the English is intelligible, in many parts it is inexact and uninspiring. The novel arrangement of Part II also has its disadvantages. The American reader accustomed to copious footnotes will find it necessary to consult the bibliographies appended to Part I as well as Part II before endeavoring to decipher the textual references.

The monetary theory involved in the analysis is fairly "orthodox." In some places, however, the author seems to have overlooked the mutuality of the relationship between the foreign exchanges and the domestic price level. Indeed, in one chapter he terms "abnormal" any influence which acts through the exchanges on quantity of money and the general level of prices.

The controversial importance of the last chapter makes it the most interesting in the book; but any claim to permanent recognition must be based upon the detailed history of the paper currency contained in the earlier chapters.

G. A. ELLIOTT

UNIVERSITY OF MANITOBA

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